JULY
1949

PESTS

and their
CONTROL

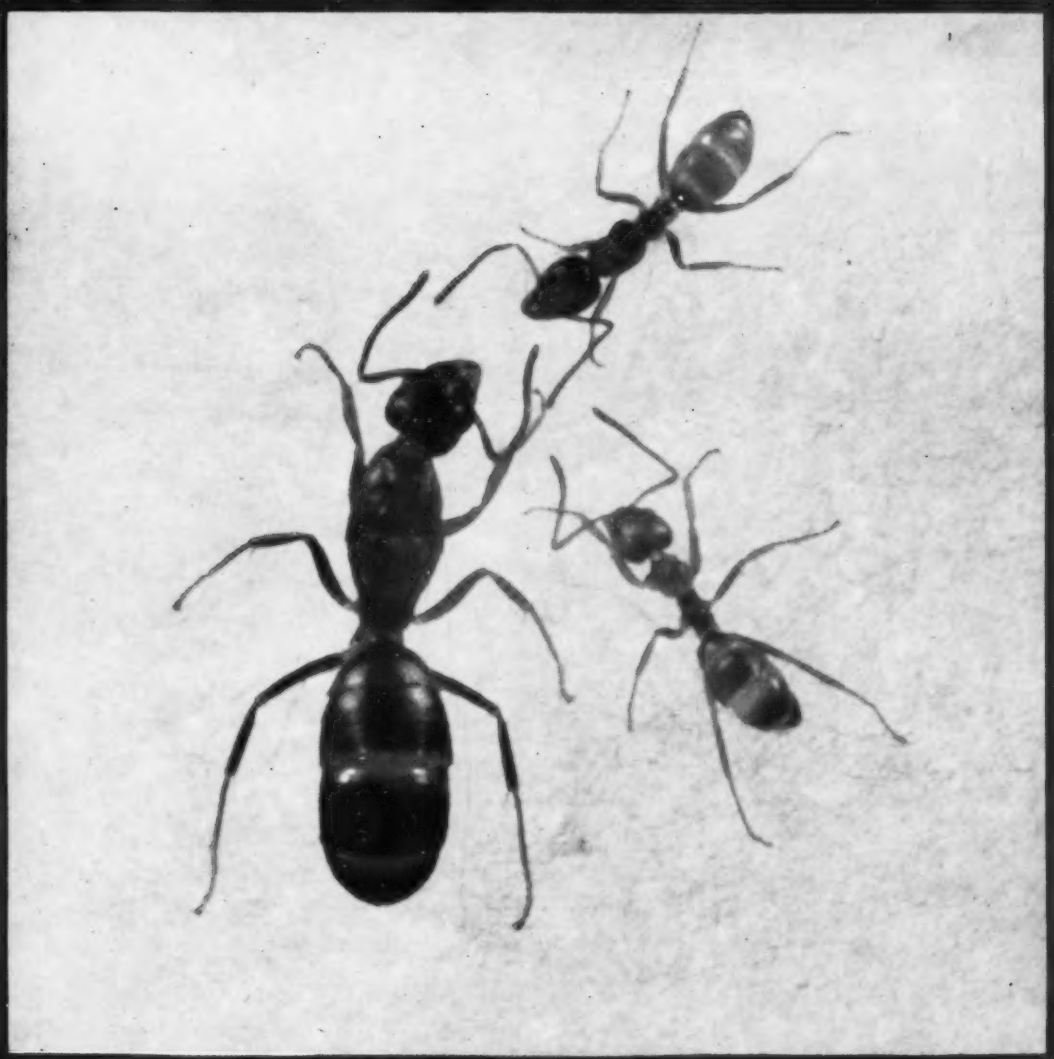

Photo by Jay de Forest

Argentine ant queen (largest in the colony) and two workers. Ants are featured in article beginning pg. 9

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PESTS and their CONTROL

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Cooperating with

NATIONAL PEST CONTROL ASSOCIATION

Contributed articles in this publication do not necessarily reflect the opinions of the editors. Discussions, comments and all types of material pertaining to pest control and other sanitation services are invited from those interested in the advancement of the field.

All contributions must be in our hands by the 15th of the month preceding issue for which they are intended.

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Purdue's PCO COURSE...

MANY PEST Control Operators who have been deprived of a college education, wished their sons and daughters could have college degrees. If their children could attend a college of reputation where they could obtain both technical and practical work in pest control and a sound educational background, so much the better. Purdue University in West Lafayette, Indiana, cooperating with the National Pest Control Association by promoting educational conferences for the PCO since 1937, was approached and it agreed to provide a four-year course especially adapted to the needs of future pest control operators.

In developing this new curriculum, Purdue considered first a series of courses which would graduate well-educated men and women, the prime purpose of a college education. Secondly, it proposed to provide a thorough understanding of pest control work plus such business courses as business law, accounting, business writing and business interview.

The PCO-Course was started in the fall of 1946. By 1948, Purdue authorities recognized the value of a PCO course, created a new teaching position and appointed John V. Osmun to conduct the seven new courses which were to be given in the Junior and Senior years. In addition, the university spent about $2,500.00 equipping a special laboratory for certain of these new courses which were in addition to the entomology courses regularly offered.

The four-year curriculum is set up as shown in the next two columns.

At the present time, Purdue has students in the PCO course from Pennsylvania, New Jersey, New York, Indiana, Massachusetts, Michigan, Illinois, Kansas and Connecticut.

A Pest Control Operators Loan Fund, established by the Purdue Conferences, is available to students enrolled in this PCO course. The National Pest Control Association also provides a $200 annual award to the freshman who shows highest proficiency in a general knowledge test, plus his freshman scholastic standing.

Complete details regarding tuition, entrance requirements, housing and other information can be obtained by writing Dr. J. J. Davis, head, Department of Entomology, Purdue University, West Lafayette, Indiana.

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4	—Biology 1a (General Biology)	4	—Biology 2a (General Biology)
3 or 4	—Chemistry 11 or 21 (General Chemistry)	3 or 4	—Chemistry 12 or 22 (General Chemistry)
3	—English 1 (English Composition)	3	—Speech 14 (Principles of Speech)
3	—Entomology 1 (Introductory Entomology)	2 2/3	— Entomology 20 (External Insect Morphology)
2	—Agr. Eng. 12 (Elementary Drawing)	3	—Economics 1 (Elementary Economics)
1 1/3	— Military Training 1	1 2/3	— Military Training
1	—Physical Education	1	—Physical Education 12
2/3	—Personal Living 9		
18 or 19 credits		18 1/3 — 19 1/3 credits	

SOPHOMORE YEAR

1st Semester		2nd Semester	
4	—Biology 18 (Bacteriology)	3	—Physics 1b (Outlines of Physics)
3	—Chemistry 29 (Organic Chemistry)	3	—Chemistry 30 (Organic Chemistry)
3	—English 31 (Expository Writing)	3	—Entomology 3 (Farm crop insects and animal parasites)
3	—Mathematics 9 (Algebra and Trigonometry)	3	—Sociology 75 (Principles of Sociology)
3	—Entomology 2 (Fruit and Garden Insects)	3	—Psychology 1 (Elementary Psychology)
1 2/3	— Military Training	1 2/3	— Military Training
1	—Physical Education 12	1	—Physical Education 12
18 2/3 credits		17 2/3 credits	

JUNIOR YEAR

1st Semester		2nd Semester	
3	—Animal Husbandry 108 (Genetics)	4	—Biology 31 (Comparative Anatomy of Vertebrate)
3 1/3	— Entomology 104 or 111 (Morphology, Ecology, and Physiology) or (Insecticides Formulations and Appliances)	3 1/3	— Entomology 105 or 106 (Systematic Entomology and Entomological Literature) or (Vertebrate Pests)
4	—Chemistry 23 (Qualitative Analysis)	4	—Chemistry 24 (Quantitative Analysis)
2	—Biology 105 (Pathology of Weeds and Forest Products)	3	—English 121 (Business Writing)
1	—Entomology 101 (Entomology Problems)	3	—Entomology 109 or 110 (Practical Applications of Insecticides)
3 1/3	— Entomology 107 or 108 (Household Insects)		
16 2/3 credits		17 1/3 credits	

SENIOR YEAR

1st Semester		2nd Semester	
4	—Biology 134 (Parasitology)	4	—Biology 133 (Systematic Zoology)
3	—General Engineering 104 (Elements of Accounting)	3	—Economics 125 (Business Law)
3	—Government 9 (American Institutions)	3	—Speech 116 (Business and Professional Interview)
3 1/3	— Entomology 111 or 104 (Insecticides Formulations and Appliances) or ((Morphology, Ecology, and Physiology)	3	—Entomology 109 and 110 (Practical Applications of Insecticides)
3 1/3	— Entomology 107 and 108 (Household Insects)	1	—Entomology 101 (Entomology Problems)
1	—Entomology 101 (Entomology Problems)	3 1/3	— Entomology 105 and 106 (Systematic Entomology) or (Vertebrate Pests)
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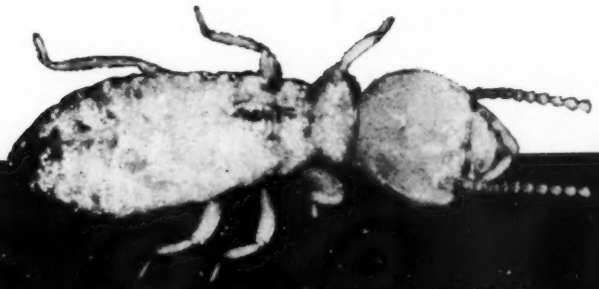

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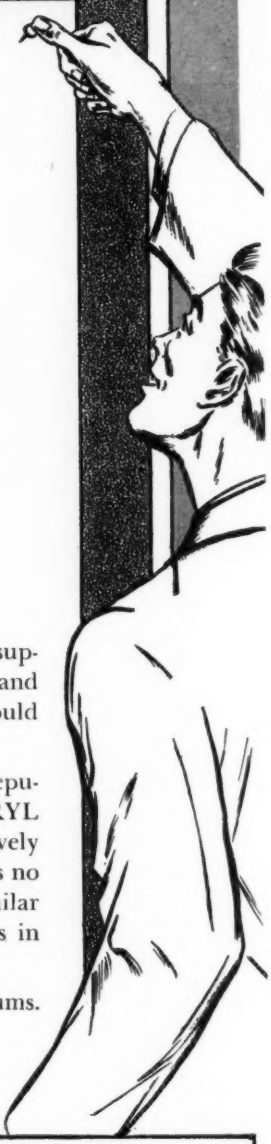

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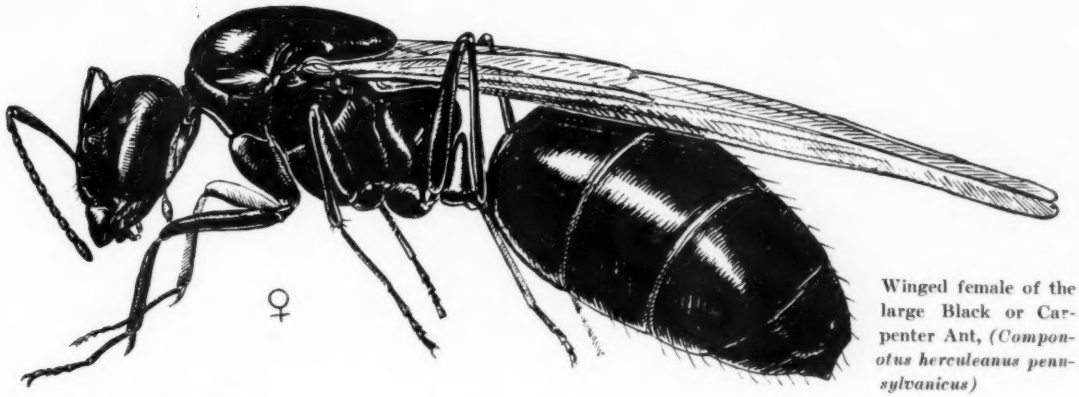


Winged female of the large Black or Carpenter Ant, *(Camponotus herculeanus pennsylvanicus)*

ANTS *and their* CONTROL

By DOUGLASS BURNETT, JR.

ANTS have been the subject of legends, myths, fables and weird stories. They have been the instrument of torture as well as benefit to man by playing a part in medicine. They are the most social, as well as the most anti-social of all the insects. Some seem to be insane because of their crazy actions. There are species which are slave owners, dairymen, fungus growers, honey storers, silken nest builders. They live in trees, buildings, under rocks, underground, in locks of doors; in fact almost anywhere they can find shelter and protection. Still others, like the Army ants of South America have no home at all, but are continuously foraging, living a completely nomadic existance.

Are they pests, and are they destructive?

They are a pest when they disturb the serenity of our household, and destructive when they eat the seeds the farmer has so laboriously planted, or when they pasture aphids on the tender roots of growing corn.

Naturally Repelled by Poisons

Ants are inordinately clever. They shun poisons, which seem to be repellent to them. Unless the instinct to return to the nest is greater than the repellency of the poison, they will not touch or walk over the usual insecticide. The author has carefully incorporated some DDT in honey. Using some unadulterated honey from the same jar, both samples were put in a laboratory ant nest. The poisoned honey remained untouched, whereas the pure honey was eaten with relish. Another time the author watched a stream of ants entering a restaurant through a tiny hole in the floor. There was a solid line of them from the hole to the kitchen some twenty feet away. The author saturated the wood around the hole with a 5% DDT solution. The stream of ants dried up. Three months later, I revisited the restaurant and was told that no more ants had been seen since the treatment.

This seems like a simple method of keeping ants out of a building. But it is not that easy. The ants will generally by-pass the insecticide, to enter through another way.

For instace, if an insecticide, such as DDT dust is spread around the hole of a nest in the lawn, another exit will be some distance away, and the colony will thrive as though nothing had disturbed it.

Ants belong to the order Hymenoptera, which includes the bees and the wasps as well. Some of the wasps are parasitic, and look like gnats of the fly family. However, they can be readily distinguished by the fact that all flies have two wings, and the parasitic wasps have four.

•

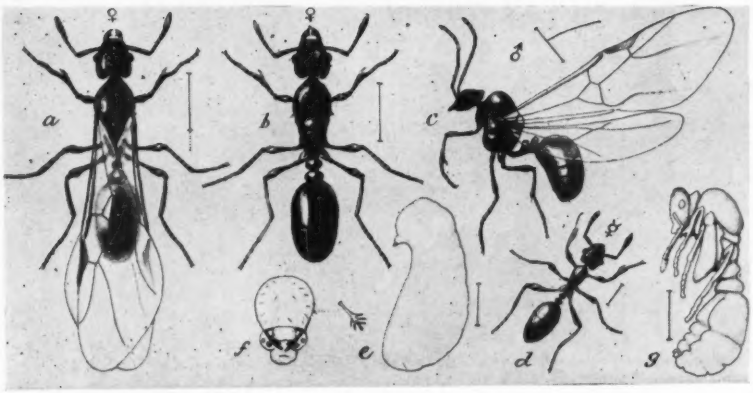
All pictures in this article courtesy U. S. Department of Agriculture, Bureau Entomology & Plant Quarantine.

Constricted Waist

Insects of the Order Hymenoptera can always be recognized by the fact that the fist segment of the abdomen is constricted into a thread-like waist. Since the termite does not have this constriction, it resembles the ant only superficially. Another difference between the ants and the termites is that the latter's wings are more than twice the length of the body, whereas the ant's wings are less than twice the body length.

It is often important to differentiate between between the ants and the smaller wasps, since a great number of the latter are parasitical on many insect pests, and are highly beneficial. The

Mr. Burnett, now associated with Theodore Meyer Estate in Philadelphia, began studying insects when he was about six years old. In the early 1930's he was Curator of Entomology at the Maryland Academy of Sciences, but then he moved to Florida. From 1943 until 1948 he was associated with the Bureau of Entomology, USDA, in that state.



Pavement Ant. (a) winged female, (b) same without wings, (c) male, (d) worker, (e) larva of female, (f) head of same, (g) pupa of same. All enlarged.

ants have one or more protuberences on the constricted first segment. These are called "pedicels." Their number, shape and position are helpful in classifying the ants. The pedicels are only found in the ants, and never in the wasps, hence there should be no confusion.

Three are some 8,000 species of ants classified. They are among the oldest of the insects, being found imbedded in amber, which is fossilized tree sap. The individuals are long lived. Workers have been kept in the laboratory for five years, and the queens (reproductive females) at least ten years. Some reports state fifteen.

Some species of ants are tremendously prolific, rivaling the termites in this respect. One ant hill observed in Maryland was measured and the population counted. The mound was found to be about 3 by 6 feet. It was approximately three feet high, and extended nearly two feet below the surface, making about 90 cubic feet. The ants in this mound were killed and counted. There were estimated to be some 750,000 individuals. In five acres of ground, there were about one hundred similar mounds, making the ant population of this area about 75 million ants. In South America, a colony of Army Ants was measured to be three hundred yards long and a foot wide.

In contrast to these huge colonies, some of the species are solitary.

The pest control operator is concerned with the social ants; those which live in a colony, care for their young, and where the individual works for the good of the community.

Life Habits

ANTS seems to have six primary instincts: 1. build a nest, 2. protect that nest, 3. forage for food, 4. care for the queens, who are the egg layers, 5. feed and care for the young, and 6. care for themselves in order to carry out their functions.

Knowledge of these instincts are helpful to the operator because they are rigidly obeyed. For instance, as the workers leave the nest to go hunting, they leave behind a trail of scent. This serves two purposes. First, it assures the worker a route home, and second it leaves a path for the other workers of the colony to follow.

If we trace the direction of this scent trail by watching the ants as they travel along it, we can often learn the position of the nest, and then destroy it, or by thoroughly spraying around the area, set up an insecticidal barrier, and so keep the ants out of the building.

When a propitious season occur, winged males and females leave the parent nest and go on a mating flight. This usually occurs in the Spring. After the mating flight, the sexes separate, and the queen, now fertilized, seeks out a nest site.

She lays her first eggs, and cares for the young workers. Often she will not eat during this period, but puts all of her energy into starting her colony. Once the first batch of workers has emerged as adults, she apparently ceases to care for the larvae and pupae, and devotes her time to egg laying. The eggs are taken from her by the workers, who care for them. The workers also feed the queen.

It is these workers which we see in the house or on the kitchen table, eating or carrying back to the nest the bits of food neglectfully left by man.

Methods of Control

There are two major methods of control of ants. The first is by poisoned food. This is the most effective, because if accepted, it is carried back to the nest and fed the queen and the young. If the queen dies, the nest is destroyed, since no eggs are forthcoming and the dying workers are no longer replaced. Then too, upon the death of the queen, the morale of the nest seems to disintegrate.

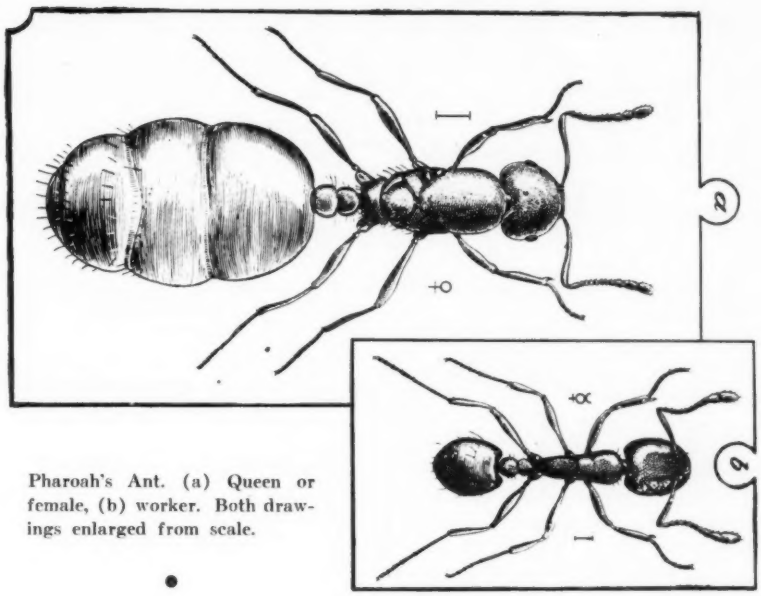
Workers have been known to lay eggs, even though they are unfertilized females. But these worker eggs invariably produce males, who are no help in repopulating the colony.

Black Carpenter Ant

Thallium, Tartar Emetic and Sodium Arsenite seem to be the only poisons that can be incorporated in a poisoed bait which cannot be detected by the worker ants. Honey is one of the most acceptable of the attractants, since most species of ants, regardless of their usual food, seem to enjoy eating it.

Most of the modern insecticides, such as DDT, Chlordane, the Pyrenones, Benzene Hexachloride, and other hydrocarbons are effective against the ants, but all of them are repellent. In spraying to control ants, the repellency factor should be remembered, and all openings between the nest and the affected area should be sprayed. While this does not kill the colony and remove the cause of irritation as does a poisoned bait, nevertheless the desired result is obtained. Two hundred cc of 2% Chlordane poured down the entrance hole to a nest seems to kill the colony. Chlordane's vapor toxicity seems to be the reason for this chemical's effectiveness.

Fumigation is a very effective method of control, but, having no residual value, it does not insure against reinfestation.



Pharoah's Ant. (a) Queen or female, (b) worker. Both drawings enlarged from scale.

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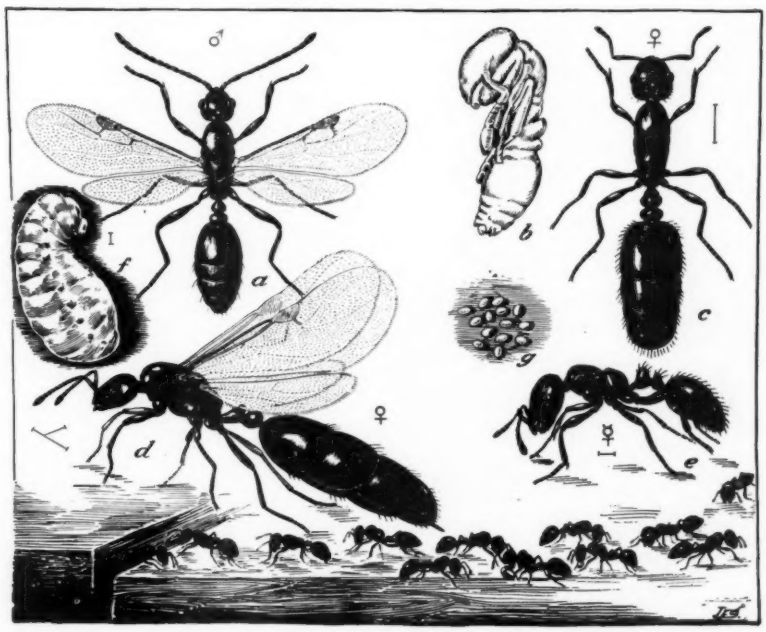
It must be remembered that in combating ants, you are fighting probably the most intelligent and resourceful of all the insects, and that they will find a flaw in your method and application if there be one. Extreme care must be used if spraying or dusting an insecticide is the method you choose to eliminate ants.



Little Black Ant. (a) male, (b) pupa, (c) female, (d) female with wings, (e) worker, (f) larva. (g) eggs, (h) group of workers in line of march. (a) to (g) much enlarged. (h) approx. 3x natural size.

Common Structural Species

The following species are generally found in buildings, and so are considered pests. There are probably many more, but most of them will affect only a local area.

1. Pharaoh's Ant, *Monomorium pharaonis* (Linn.). Length 1/12 to 1/10 in. long. (2-3 mm.). Tiny, slender and reddish in color. They infest groceries, apartment houses, hotels, cafes, restaurants, row houses ad similar places. They are omnivorous, liking sweets, fats and proteins. They nest in the walls and foundations of buildings. They forage throughout the year. There are many queens in one colony.

2. Little Black Ant, *Monomorium minimum* (Buckley). Length 1/12 to 1/10 in. long. (2-3 mm.). Nest mainly out of doors in the soil where they make small craters, or in stumps, but sometimes in the walls of buildings. Unlike the Pharaoh's Ant, this species is native and is a common house pest in both the town and the country. They are omnivorous, eating sweets, insect honeydew, fruits, vegetables and meats.

3. Odorous House Ant, *Tapinoma sessile* (Say). The workers are from 1/10th to 1/8th in. long (3-4 mm.); soft bodied, brown to black, have a broad abdomen, and are not very agile. When they are

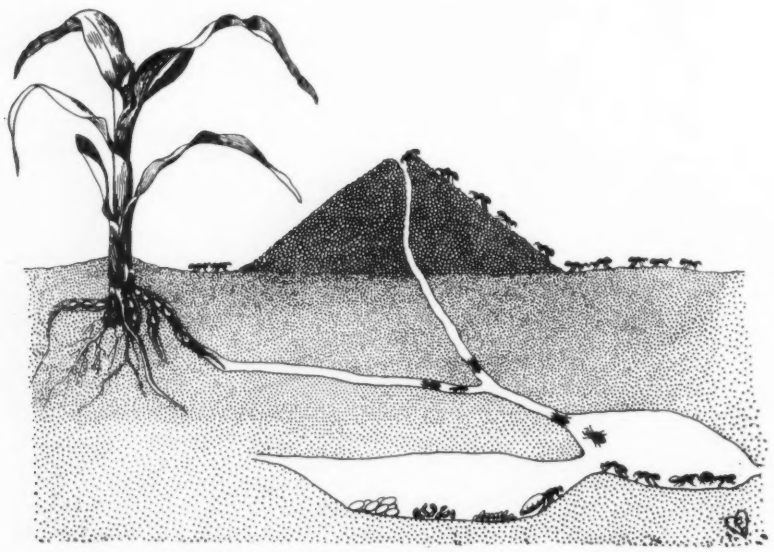
crushed, they have a sweetish, nauseating, rotten coconut-like odor. They live most of the time out of doors, but they have been found in foundations of buildings. They are practically omnivorous, but they prefer the honeydew of sects.

4. Tiny Thief Ant, *Solenopsis molesta* (Say). The workers are yellow to light bronze in color, and are 1/15th to 1/10th inch long (1-1.5 mm.) which makes them smaller and lighter in color than the Pharaoh's Ant. They ally nest out of doors in soil or wood. They are seen only in warm weather. These ants are a common house pest. They prefer a protein diet, and so seek meats, butter, oils, cheese, seeds, nuts and other proteins in preference to sweets. They sometimes do damage to germinating seeds in vegetable gardens.

5. Cornfield Ant, *Lasius niger* var. *americanus* (Emery). because it does damage to lawns by making them unsightly with their mounds. The workers are 1/12th to 1/10th inch long (2-3 mm.). They are robust, soft bodied, light to dark brown in color. They nest in open soil or rotten wood. When the body is crushed, it has an acid (formic) odor. These ants prefer sweets, such as insect honeydew.

6 Black Pavement Ant, *Tetramorium caespitum* (Linn.). Workers are 1/12th to 1/7th in. long (2-3 mm.). They are rather robust, hairy, hard bodied insects. The body is black, and the appendages are pale, which could be called brown. They are commonly found in lawns in or near towns. Their favorite nesting place is under stones or at the edge of pavements, from whence it forages into houses and greenhouses. Its main food is seeds or plant roots.

7. Perfumed Yellow Ant, *Lasius interpectus* (Mayr). The workers are 1/10th to 1/8th inch (3-4 mm.) long. They are yellow. When crushed they have a lemon-verbena small. Their nest is in the soil. Their main objection is that they harbor aphids, as cows, getting the honeydew from them. They carry the aphids down to the roots of plants, where the latter do much damage, since they suck up the plant juices which should go to the nurturing of the plant. Sometimes they nest in the foundations of buildings, from whence they emerge as winged ants and cause much concern. Often the householder thinks they are termites. But they do no damage since they do not attack human foods.



Cornfield Ants attending aphids.

8. Black Carpenter Ants, *Componotus herculeanus pennsylvanicus*. The largest of the workers are from 1/4th to 1/2 inch long. The body is from dark brown to black. When crushed, they have an acid odor (formic). They are native to the Eastern United States. They nest in wood, which they hollow out, but do not eat. They are fond of sweets. They will bite people, but they are incapable of stinging. In addition to nesting in logs and tree stumps, they nest in telephone poles, sills and timbers of older buildings.

9. Argentine Ant, *Iridomyrmex pruinosus humilis* (Mayr.) Workers or sterile females are 1/12th in. long (2.2-2.8 mm.) but they may appear longer when abdomen is extened with food. Varies from light to dark brown, with thorax, scapes and legs lighter, mandibles are yellowish. Queen is almost twice as large as workers, largest ant in the colony.

Powder-Post Beetles in Bamboo

On November 24, 1947 an investigation was made of the occurrence of beetles in a shipment of bamboo in the stock of a company manufacturing decorations and window displays in Hamilton, Ontario. The bamboo had been imported from Florida and consisted of about 40 stalks about 10 feet long and 1 to 4 inches in diameter. Numerous emergence holes about .06 inch in diameter appeared over the surface of the stalks.

Many small beetles, *Dinoderus minutus* Fabr., were crawling about on the stalks and in a pile of fine wood powder at the base of the stalks. Slight pressure of the sides of the stalks caused the walls to collapse, disclosing the wood riddled with galleries, and a fine powder of wood filling the cavities in the internodes of the bamboo.

Beetles were crawling actively in the galleries of the wood. No larvae were found when the stalks were broken up and the wood examined.

—Summary from "Powder-post Beetles Imported Bamboo" by W. W. Judd, McMaster University, Hamilton, Ontario, the Journal of Economic Entomology, February 1948, p. 113.

Can You Identify FLIES?

How to Identify the kind you find In Houses and What to Do About Them

By DAVID G. HALL

Bureau of Entomology and Plant Quarantine
Agricultural Research Administration
U. S. Department of Agriculture

David G. Hall

FLIES THAT ANNOY people most in their homes are often an amazing problem to pest control operators. People are fully aware that flies carry diseases and contaminate food. When they ask for help, they want it quickly and effectively. Pest control operators called in on a fly control problem can do the best job by (1) knowing exactly what kind of flies are causing the trouble and (2) doing exactly the right thing in the shortest possible time.

Two General Groups

Flies found in homes usually fall within one of two general categories — a kind that breeds outside or a kind that breeds inside the house. The first group includes house flies, blow flies, cluster flies, flesh flies, and a host of others. PCOs can protect people from being annoyed in their homes by such flies, but real control must be based on a knowledge of the habits of the flies and will be obtained only when the proper measures have been applied outside the home. You should remember one simple fact — regardless of what you do to protect a home from flies, it will do little good if no attempt is made to control the flies at the source. For example, if pigs are being fed garbage only a short distance away, that is the critical area for control. But flies that breed inside homes are usually simple to control. All you need to do is know where to find their breeding places and dispose of the breeding media.

Here's a list of common flies found inside homes. Points of recognition are given to help determine what the flies are. Enough of their biology is given to help decide what the best chance for controlling them will be, and correct measures are suggested.

House Fly

Musca domestica. This is the common house fly. (See fig. 1). It is black to blackish and more or less covered with grayish pollen, with the abdomen often extensively yellow or orange. The back of the thorax usually has 4 black longitudinal stripes. The terminal segments the arista (a process on the antenna) is strongly thickened at the base and the fine hairs are very long — the longest usually half the length of the arista, or more. If you examine the illustration you'll see that one of the long veins of the wing is bent forward at a strong angle and reaches the margin of the wing before the wing apex. The anal vein does not reach the wing margin.

The house fly occurs practically all over the world. It breeds primarily in the manure of animals, often when mixed with straw or hay, or in mixed garbage. The very worst house fly breeding can occur about garbage dumps or where pigs are being fed garbage.

The female of the house fly may produce from 120 to 150 eggs at a batch and there may be from 5 to 20 or more batches produced during her lifetime. A generation may be completed in less than three weeks and development is continuous throughout warm weather.

Control of the house fly should be directed primarily toward the original source of the infestation. This includes (1) proper sanitation in barns and stables, (2) proper disposal of vegetable matter, garbage and manure. Unsanitary sources of fly breeding should be brought to the attention of the proper health authorities. The use of residual sprays in barns, sheds, and out-buildings will control house flies under most circumstances. DDT is the insecticide of choice. When this material does not seem to give adequate control, methoxychlor, chlordane, gamma benzene hexachloride, or certain other of the new residual chlorinated hydrocarbon insecticides may be tried. *Don't forget that methoxychlor is the only chlorinated insecticide now recommended for use in dairy barns and on dairy animals.*

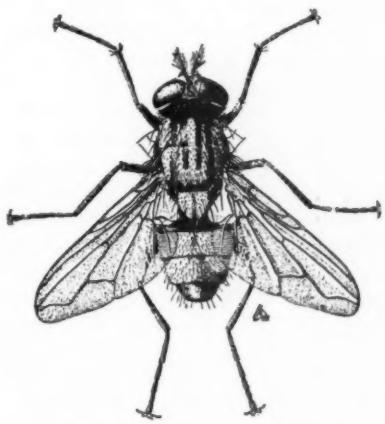


Fig. 1. *Musca domestica,* adult male.

Pest control operators can protect the inside of homes from house flies by being certain that the house is fully and tightly screened. This is one of the most important things that can be done to exclude flies. Be sure that all window screens and screen doors fit tightly and are in good repair. It may seem simple that springs or various types of closing mechanisms should be checked, but this is an important matter.

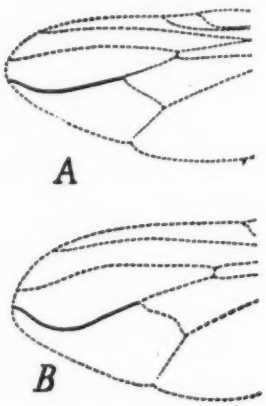


Fig. 2. Venation of apical half of wing: A. *Muscina stabulans;* B. *pascuorum.*

Inside Use of Residuals

It's a simple matter to apply a residual insecticide to screens with a paint brush. This residual treatment is usually an assurance that flies accidentally entering homes will die within a few hours. Residual insecticides can be applied also around doorways and porches, as well as to window and door frames, hanging light fixtures, arches, beams, and any other interior surfaces where flies like to rest. One application should last at least two weeks — often considerably longer, especially on the inside. If the householder demands immediate relief, show how to use the new aerosol insecticides. You will have to explain, of course, that space sprays furnish only temporary relief and are only emergency measures or are supplements to residual sprays.

Control of the house fly depends largely on community effort, both with regard to sanitation and use of insecticidal treatment. Contract sprayers can play an important part in fly control programs but they should remember that no insecticide can take the place of thorough, effective sanitation for housefly control.

Muscina stabulans. The flies of the genus *Muscina* may be distinguished from other common flies by the following combination of characters: the body is robust, brown or black in ground color with rather dense grayish pollen which is of a changeable appearance on the abdomen, depending on the way the light falls upon it. The tip of the scutellum (upper part of the thorax) is more or less reddish or yellow. The arista is long-plumose. If you will examine the wing drawings, (see fig. 2) you will see that the long vein shown by a heavy black line in the figure is distinctly bowed forward, but the bow is broad and the bend is not very sharp. You may have some trouble making up your mind whether these flies might be sarcophagids (family of fleshflies). There are three species of *Muscina* in the United States, but only two of them are common.

Adults of these flies feed on various substances, but particularly on spoiled or fermented fruits or vegetables. The larvae occur primarily in decaying vegetable matter. Rotten or decaying tomatoes are a favorite breeding material. The females frequently enter houses and may oviposit on foods, particularly those slightly tainted. Each female may produce from 140 to 200 eggs which she scatters about over the food she selects for her off-spring. Several generations may be produced in a summer.

Control of species of *Muscina* is primarily a matter of home protection. This includes full screening and treatments of screens with a residual insecticide such at DDT, or with space sprays. A heavy infestation of *Muscina* certainly indicates that a check should be made to find whether piles of waste are present in the vicinity. Canneries, particularly tomato canneries, should be investigated to see if proper arrangements have been made for pulp disposal. Improper disposal of most wastes is a matter of interest to public health officials.

Stable Fly

Stomoxys calcitrans. It's easy to tell the stable fly from other flies because it has a long, rigid, slender, shiny-black proboscis which it uses for piercing the skin and sucking blood. The palpi (mouth feelers) do not extend beyond the middle of the proboscis. (See fig. 3). The arista (the bristle on the last segment of the antennae) has no rays below. This fly greatly resembles the house fly but the biting mouth parts will distinguish it in an instant. There is only one species of *Stomxys* in this country, and it is generally distributed over most of the United States. In some states, it is better known as the dog fly.

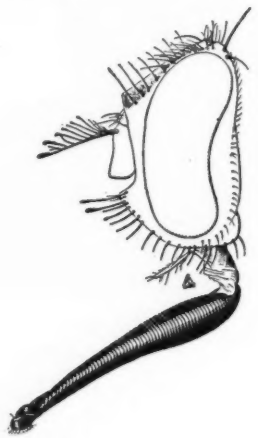


Fig. 3. *Stomoxys calcitrans.* Stable fly: head of female, side view.

The larvae of the stable fly breed most frequently in decaying vegetable matter such as decaying hay, straw stacks, peanut litter, and celery or cannery wastes. The female deposits eggs which hatch in one to three days. It takes from 11 to 30 days to complete one generation, and there may be a number of generations in a season. Both males and females are savage biters, but they attack animals in preference to man. However, they often bite man, especially when they shelter indoors before a rain. This is the basis for the frequently heard expression that "house flies bite before a rain."

Outbreaks of stable flies in

cities often follow a heavy application of barnyard manure to lawns in the springtime. Pupae of the flies are sometimes brought to the city from the country in decaying organic matter. The emerging adults frequently make life in the vicinity miserable for several weeks or more.

Control of the stable fly in rural areas is similar to house fly control. Elimination of breeding sources is essential. Residual sprays in barns or other buildings, and on vegetation where the flies rest, will help. Protection of homes from the stable fly depends on screens and residual spraying as in the case of the housefly.

Latrine Flies

Fannia species. These small to medium sized flies can be distinguished quickly from other flies found in homes by the short anal vein which curves forward strongly in such a way that it would intersect the vein just ahead of it if that vein were prolonged. (See fig. 4). There are a number of species in this country — but only a few of them are of importance. These are sometimes called lesser house flies, or latrine flies, because they are common in outdoor toilets.

Larvae of *Fannia* breed in vegetable or animal matter in an advanced stage of decomposition. They also breed in excrement and fermenting foods. They are extremely common in privies or about cesspools. Some of the species have occasionally been reared from fruits, smoked or salted meat, cheese, and other milk products, There may be two or more generations a year. Adults often frequent homes.

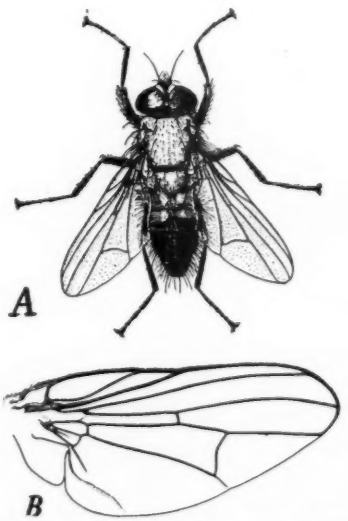


Fig. 4. *Fannia canicularis*, Lesser Housefly very similar to the Latrine fly: A. adult male, B. wing.

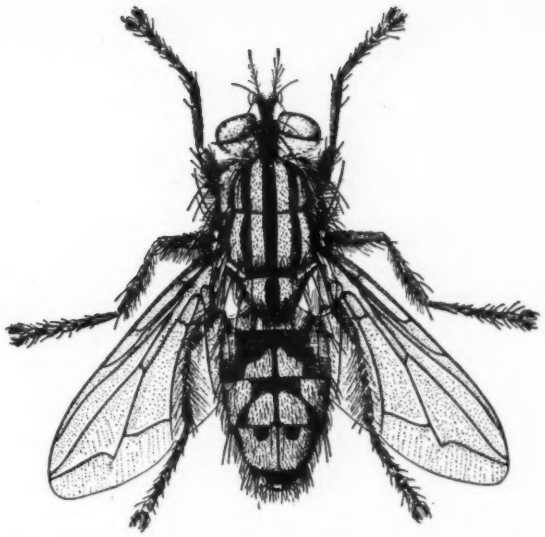


Figure 5

Sarcophaga haemorrhoidalis, Fleshfly: Adult Male

Control of *Fannia* flies in houses obviously should include a preliminary search directed toward finding the original source of the infestation. Look for decaying materials such as potatoes or onions in the kitchen or cellar. Residual sprays on window and door screens will help to keep those that develop outside from getting inside the house.

Fleshflies

Sarcophagidae. There are many kinds of fleshflies, various species occurring throughout the world. In general, these flies are gray with the abdomen marked with checkerboard patterns. (See fig. 5). The arista is plumose above and below for more than half its length. The wing venation shown in the figure is quite typical for the whole family.

Many of these species are found about the carcasses of dead animals. Some are excrement breeders. Any of them may accidentally enter houses.

A frequent inquiry concerns the presence of fly maggots crawling about on walls or floors. These maggots usually can be traced to a dead rat or bird in the walls or chimney where larvae of fleshflies are breeding.

Control of fleshflies in and about homes, aside from breeding as noted above, is usually a matter of home protection. This includes full screening and the use of residual insecticides.

Blow, Blue, Green Bottle

Calliphoridae. These are middle-sized, metallic, blue-green or copperish flies, or larger flies with bright, metallic blue abdomens. They are well known as blow flies or as blue bottle or green bottle flies. There are a large number of species of blow flies. Many of them accidentally enter homes. The metallic color will rather definitely identify a blow fly. There are, however, a few other characters that will help one to be certain. The arista is long-plumose nearly to the apex. As with the *Sarcophagidae*, the wing venation is fairly uniform throughout the family. (See fig. 6).

The larvae almost invariably feed on decaying animal matter. A few of the species are parasitic and some infest human wounds. Although various species of blow flies can be found all over this country, some are rather local in their distribution. It is suggested that operators with blow fly problems consult "Blow Flies of North America," a book published in 1948. This book tells you what you need to know about blow flies

Figure 6

Callitroga americana,

adult female.

and their control in the United States. It can be see at larger libraries, or can be purchased from Professor J. J. Davis, Editor, The Thomas Say Foundation, LaFayette, Indiana.

Control of the individual species of blow flies more or less depends on the species involved. Obviously those that breed in carcasses of animals are most easily controlled by proper carcass disposal. Suitable arrangements made for the protection of homes from house flies are ample for protection from blow flies. There is one point, however, that operators should keep in mind. Since most blow fly species breed in decaying meat, some of the species may occur in homes where mice, rats, or birds have died in the cellar, between walls, or other places. Serious infestations can occur in dry or smoked meats. These points obviously should be kept in mind when control operators are called upon in consultation for blow fly control.

Cluster Fly

Pollenia rudis. The cluster fly is of medium size and is dullish black, more or less covered with grayish. The thorax bears a number of yellowish or grayish soft, crinkly hairs in addition to the silver.

The larvae of cluster flies are internal parasites of earthworms. The adults enter houses in great numbers during late fall, when they are seeking a protected place in which to hibernate, and can be found then in spare bedrooms, attics, or closets. Apparently there are four generations each year in the United States. Although the cluster fly occurs in most parts of the United States, it is most abundant in the northern part. There is only one species. Pest control operators are often called to control these flies during winter months. If an infestation is once seen, it will never be forgotten. The householder is almost always extremely anxious to have something done about the situation at once. The flies are very oily and leave a great grease spot when crushed. Curtains, drapes, and wallpaper are often stained by them.

Control of the cluster fly cannot be accomplished outside the home. Try to determine where the flies are entering the house and close these openings where possible. Such openings may be around or under window frames or between the eaves and the roof.

Once inside, the flies often rest within the walls or between partitions where it is impossible to reach them with an insecticide. On warm days during the winter a few may revive sufficiently to come out into the house where where they crawl or fly around sluggishly, often clustering on window sills. Housewives really hate them. It will be helpful to apply a residual spray in attics or rooms where flies appear, putting it around windows, on wall surfaces, on floors or other places where the flies may crawl. This kills them off as they come out of hiding and get into the deposit, but the residues kill flies slowly and others remain hidden, to come out later. Try to find out where the flies have congregated in attics or closets. If you can find them, it is often possible to spray them directly with a good contact spray and kill most of them at one time. Fumigation has been effective in some cases but this is an extreme measure and is usually too costly in comparison to the importance of the problem. Fumigation may not be effective where the infestations are in attics which cannot be sealed tightly enough to retain a lethal concentration of gas, or when the flies are within walls where the fumigant will not penetrate.

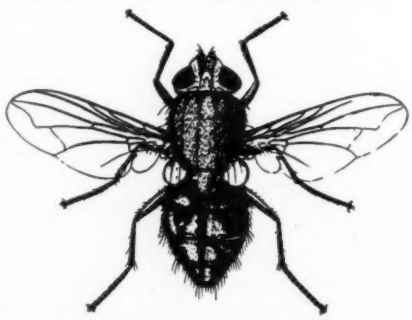
Pest control operators can point out to the home owner that these flies are in the house for the purpose of hibernation only, do not reproduce during the winter, will leave in the spring, and have no public health sigificance. Such explanations, however, usually have little beneficial effect.

Fruit Flies

Drosophilidae. The fruit flies rarely exceed 5mm. in length. The flies are generally yellowish. The arista is plumose.

These are the gnats found about fruit frequently in homes during summer months. They are often called sour flies or vinegar gnats. Numerous species occur all over the world. The larvae of our common species breed in over-ripe fruits, garbage, fermenting liquids, and similar materials. Development is very rapid and there are numerous generations of 8 to 12 days each during the warmer months.

Control of fruit flies can usually be accomplished by proper disposal of their breeding source. Adults can crawl through the



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mesh of ordinary screens, but painting the screens with a residual insecticide will kill flies attempting to get into the house from outside. Proper disposal of a dish of over-ripe or decaying fruit which may be present in a home will solve the fruit fly problem in many cases. A space spray may be used to get immediate relief from fruit flies already present.

Moth Flies

Psychodidae. This family includes the tiny moth flies which rarely exceed 4mm. in length. The wings are broad, often pointed (see fig. 7), and are usually folded roof-like over the back when the fly rests. The wings are typically densely covered with long hairs, but these are easily rubbed off. The identification of the different species of these flies is very difficult.

The eggs are deposited in irregularly-shaped masses of 20 to 100 or more. The development is rapid. The larvae are aquatic or semiquatic. They can be found in moist places, such as ditches and decaying vegetable matter. They often breed abundants in sewage disposals plants filter beds.

Home owners frequently complain of finding these tiny flies around laundry tubs, drains, washbowls, or bathtubs. A gelatinous coating of organic matter builds up in drain pipes between the water trap and the overflow outlet. The larvae develop in this gelatinous matter, where they seem to be protected against insecticide applications.

Control of these flies breeding in drains is sometimes difficult. It is best to clean out the sections of the drain where breeding is occurring. Even rather hot water does not affect the larvae within their protective medium. Sometimes it is possible to control the flies by applying boiling water, at the same time using a probe to dislodge the gelatinous film. In many cases it will be necessary to disconnect the drain pipes and clean them out with a cloth swab attached to the end of a stiff wire.

Mosquitoes

Mosquitoes. There are numerous species of mosquitoes and many of them have widely diverse habits. Larvae of mosquitoes develop only in the presence of free water, and permanent mosquito control is based on taking the water away from the mosquito larvae by various methods, or on treating the water to kill the larvae. Mosquito problems differ in different parts of the country, depending upon the environment and the species concerned. Some of the most frantic appeals for help coming to pest control operators are the result of mosquitoes emerging from the water in a cistern beneath a house, a stopped-up rain spout, a tin can, a discarded auto tire, or a neglected flower vase in a living room. It is often a simple matter to seek out such breeding places and empty the water from the containers.

Fig. 7. *Psychoda alternata*, Moth Fly, denuded wing to show venation.

In places where huge mosquito breeding areas exist, as in the salt marshes, mosquito control may be beyond the individual pest control operator's capacity. Adequate salt marsh mosquito control, for example, depends on community effort. Custom sprayers can help protect sections of a community from mosquitoes in many places. Adequate mosquito control takes planning under any circumstances, regardless of by whom it is to be done.

Residual sprays applied in and around a residence will be helpful in reducing mosquito annoyance where community control programs are not in effect. On the inside of the house, the spray should be put in dark places where mosquitoes hide during the day. This includes the underside of furniture, dark corners and other secluded spots. The window and door screens should also be treated. Further beneficial results will be obtained by applying a residual spray underneath porches, to shrubbery around the house, inside dark outbuildings, and in any other places where mosquitoes may hide during the day in the immediate vicinity of the house.

Sand Flies

Sand flies. These insects, also called punkies or "no see-ums" are species of *Culicoides.* They are extremely tiny flies that breed in water in holes of trees or along heavily shaded marsh edges. There are only a few generations of these pests a year, but when they emerge, everyone in the vicinity complains bitterly. Their bite is vicious, out of proportion to their size, and causes a local reaction to some people. There are a number of species and a few species occur locally nearly everywhere in the country.

These little pests are extremely difficult to control. They can be controlled in many instances by diking, and through draining by means of automatic tide gates along the salt marshes of the Atlantic Coast, particularly South Carolina, Georgia, and Florida. This is a job of engineering, and community effort is required. In residential areas it is a good idea to drain and fill tree hole breeding places with concrete. Protection of individual homes can often be accomplished by the use of residual insecticides on screens and around outside light fixtures. Aerosol or other space sprays can be used to kill any of the flies that succeed on getting into homes.

Fly Identification

Pest control operators confronted with fly problems in which it is imperative to know the exact species of flies involved, and their biology, should forward dead specimens of the flies in layers of cellucotton in pillboxes, to the Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, Washington 25, D. C. with a covering letter of transmittal. The date and place of collection should be stated. It is also desirable to give any additional background information or observations you can relative to the information or existing conditions which might have a bearing on the case. This is particularly helpful in the occasional instances where rare species or un-

(Continued on page 42)

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What it Takes to be an ARBORIST

By PAUL E. TILFORD
Executive Secretary, National Arborist Association

FROM TIME to time there has appeared in *Pests and Their Control*, and elsewhere, suggestions that pest control operators could look to the field of tree care as a means of further utilizing their personnel and equipment to produce extra profits. It is an old saying that — the grass on the other side of the fence looks greener. Most of us at times, look at the other fellow's job, think it looks easy, and wish we could jump the fence and try a few mouthfuls. Usually when we do that, we soon learn that what appeared to be a lush field of clean alfalfa is abundantly sprinkled with thistles, poison ivy, and nettles. After floundering around for a while, we get back into our own field, nurse our wounds, and either stay there, or go back to enter the new field through the gate, observing the sign posts and following their directions on how to avoid the pitfalls.

Requirements

I have been asked to prepare an article on what a person needs to know and how to equip himself to enter the shade tree care field. First of all, to be successful in this work, one must love trees and ornamental plants. The person who isn't "wild about trees," regardless of any dollar signs which he thinks may hang on them, will never learn to really know them. In most any city well over a hundred species and varieties of trees will be found. That they are all trees is true, but they react differently to treatments and environmental conditions. It is essential that the arborist know trees. He may know that dormant oil spray used to control scale insects will kill sugar maples but that doesn't do him any good if he can't recognize sugar maples when dormant oil spraying is done. He may have heard that DDT will sometimes injure Scotch elm foliage, but the information is of no value if he can't distinguish a Scotch from an American elm. Numerous similar illustrations could be given, but maybe enough has been said to emphasize that you must really know trees if you are going to work with them or on them.

The identification of trees can be learned in different ways but there is no quick way. Some colleges and universities give excellent courses covering ornamental woody plant materials. Many people, because of an intense interest in trees, have learned to know them from books and observation. Others have knowledge of trees acquired while working with them under the supervision of a trained arborist, landscaper, plantsman or nurseryman.

It is not enough to be able to identify trees at all seasons of the year. It is equally important to know how the different species respond to different environmental conditions. Most any landscape planting will have several species of trees which are not native to that area. And, usually trees used in landscaping are growing under conditions which are artificial. The environment — because of excavations, soil compaction, changes in drainage, etc. — may be entirely different than in a forest. The environmental factors influence the health of the tree, how it grows, and may determine what you can or can't do for it.

NOW, after that introduction in which I have tried to say, that if you are going into shade tree work, you must know trees and how they grow, let's take a look at what an arborist or tree expert does.

1. *Diagnosis.* — When valuable trees begin to decline and it is evident that something is wrong, the owner calls an arborist to "cure" them. Before any treatment can be intelligently recommended, the cause of the trouble must be determined. This may be relatively easy or extremely difficult. A tree is a living thing, subject to fungus, bacterial and virus diseases, insect pests, climatic variations, changes in soil conditions, and many artificial conditions imposed upon it by man in making over the landscape. Just as a physician treating human illnesses must be able to recognize the symptoms before he can proceed with a remedy, so the arborist must be able to recognize the symptoms of types of injury. Even before he can do this he must know what a healthy tree of this species, or variety, of this size should look like when growing under the environment and exposure in which the particular tree under consideration is growing.

In making his diagnosis the physician has a definite advantage over the arborist — his patients can usually say "Ah" or let the physician know where the trouble is. To be a good diagnostician, the arborist needs a knowledge of plant pathology, entomology, soils and botany, in addition to experience and good judgement.

2. *Spraying.* — Many leaf diseases as well as insects, such as scales, mites, aphids and several defoliators are controlled by spraying. The amount of shade tree spraying done varies greatly from year to year and in different localities. During some seasons shade tree insects are abundant and at other time biological controls work so well that little spraying is needed. To spray shade trees large equipment is required and the investment in sprayer and truck at present prices will exceed $4,000. Mist blowers are replacing hydraulic sprayers to some extent, but they have not decreased the investment in equipment. Many of the new fungicides and insecticides are finding uses in disease and insect control on trees but the careful operator uses a new product cautiously at first. Possible injury

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(signed) Carl Strom

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to the trees being sprayed or to other plants which may be in the path of spray drift or drip must always be considered. The particular tree species, its vigor, and climatic conditions at the time of application, as well as the spray formula are factors involved in the susceptibility of trees to spray injury.

3. *Fertilizing and Aerating Soil.* — Trees in street and landscape plantings become low in vigor when the supply of available soil nutrients becomes low. Such low-vigor trees are more susceptible to attack by many insects and diseases than vigorous trees. Fertilizers, injected into the soil in the root area, correct these deficiencies. Injection of the fertilizer into the soil by compressed air, liquid jet feeding, and the common punch bar method are common ways of fertilizing trees.

When the soil in the root area of a tree becomes compacted the roots do not function properly and then the top soon starts to decline. This soil condition is corrected by the use of a special gun and compressed air. The same equipment is often used to free soil around trees of toxic gases.

4. *Moving Large Trees.*—Fairly large trees are commonly transplanted for new homeowners. Big trees must be moved with a ball of soil so that the roots are not seriously damaged. The soil ball necessary in moving a tree of 12" trunk diameter will weigh about 10 tons. To move the tree and soil ball from its original location, perhaps over soft ground to the new home site, place it in the hole at the right depth, have it straight and keep it that way, is an engineering feat. To protect the newly transplanted tree from borers, sunscald and get it to grow is a horticultural accomplishment. Winch trucks, special tree mover equipment, snatch blocks, rope, cable, chain, picks, shovels, planking, burlap, guy wire, plenty of labor and the know how is what is necessary.

5. *Cabling and Bracing.*—Many trees develop structurally weak crotches. Large branches often break off during high winds or under the weight of ice and snow. The proper installation of cables and screw rod will usually prolong the life of, and protect trees from such damage. Sometimes such installation presents a problem in engineering.

6. *Pruning.*—In all cases pruning not only requires the physical ability to climb the tree and remove the undesirable branch, but the operator must be able to do so with safety to himself, his client's property and the public and in a manner that will improve or best preserve the tree. Dead, weak and dangerous branches are removed from trees. Pruning is done to clear utility lines. Often trees are pruned so that a particular view or vista may be seen by the owner. In cases where a tree has suffered root damage, pruning may be advisable to bring the top in balance with the root system.

In removing large branches from trees or in taking trees down, it is necessary to use ropes if the trees are near buildings or streets. It is well to be sure your liability insurance is paid before starting such a job.

To do any work in trees it is necessary to climb. Getting around in trees efficiently and safely is an art that is acquired only through training and experience. Progress has been made in developing safety methods for tree workers, but such work is still somewhat hazardous. Workmen's compensation insurance for tree workers in some states amounts to over 10 percent of the payroll.

Chain saws have taken some of the backaches out of tree removals but no easy and practical method of removing stumps has been discovered.

There are many other phases of tree work which shade tree service companies do. Some of these are repairing storm - damaged trees, making cavity treatments, installing lightning protection systems, making treatments for some diseases and insects that are not controlled by spraying, installing aeration and protection systems when the soil grade around trees is to be changed and making tree wound treatments. Space is not availabale for further discussion of what an arborist does.

For PCOs Who Have Thought of Going Into Tree Work, Mr. Tilford Says Much Study Is Necessary

Where to Learn

NOW, how does one learn to do these things? There are a number of colleges and universities where courses in arboriculture are given. Ohio State University, Michigan State College, New York State College of Forestry at Syracuse, and Massachusetts State College give special work in this field. Most of the land grant colleges give work in botany, forestry, plant physiology, horticulture, soils, entomology, and plant pathology. Academic training in these subjects is desirable for one who expects to make arboriculture his life work. After such training, however, one is in the same position that the doctor is in when he finishes medical college. The doctor must become an intern before he is qualified to establish a practice of his own. The prospective arborist should work with a good tree company for a while to gain practical experience.

The managers of many tree service companies are not college graduates. In almost every instance these men obtained their start by working for a good arborist, and hard study. They have grown into the work gradually and in most instances give a good service to the tree-owning public.

There are many sources of information on arboriculture. The National Shade Tree Conference is in its twenty-fifth year. The published proceedings of its annual

(Continued on page 26)

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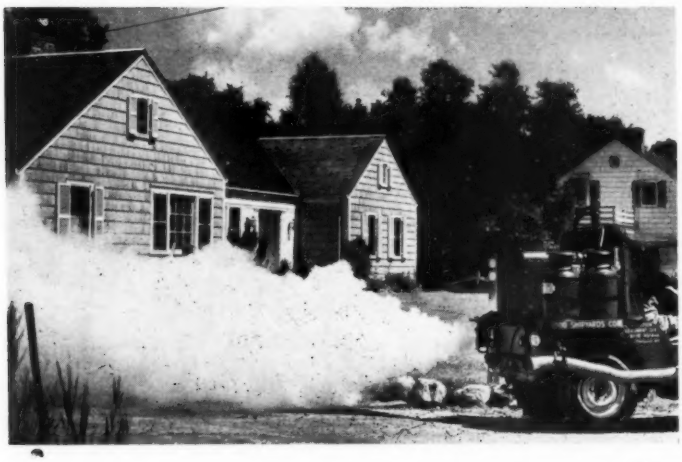

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LAFAYETTE'S *Fly Program*

Reported by

HARRY BAUMAN

LAFAYETTE — West Lafayette's (Ind.) fly control program was conducted as a civic project by the combined efforts of the following civic clubs: Junior Chamber of Commerce, Chamber of Commerce, Rotary, Kiwanis, Lions, Exchange, Optimus, Pilot, Altrusa, Women Federated Clubs, city officials of both cities and Purdue University.

To aid the program in the actual work, we were able to secure the services of Reliable Exterminators, Inc., and Prof. John W. Osmun, Department of Entomology, Purdue University, acting as our Technical Advisor. The mayors of both cities declared Official Fly Control Weeks during the weeks set for conducting this campaign. The planning as to the actual spraying of this campaign was worked out by Harry H. Bauman, Lion's Club Representative, Entomologist from the Reliable Exterminators, Inc. The money for financing the campaign was raised by pledges from the civic clubs (both men's and women's) and from certain members of the Chamber of Commerce.

Three meetings were held and attended by representatives of each of the clubs mentioned above, newspapers, radio station, city officials, and Purdue University. A general chairman was appointed; he in turn appointed chairmen of finance, newspaper, publicity, volunteers and actual spraying work.

In order to simplify the finances, they were put under complete control of the chairman who collected and dispensed all bills. Chemicals were ordered and paid for immediately. No bills were allowed to accumulate. The budget for two weekly sprayings was set at $2500.00. Each club contributed whatever it was able, with the Rotary, Kiwanis, and Chamber of Commerce bearing the bulk of the contributions.

In order to protect the committee and other sponsors from the damage claims which might have very easily arisen during the course of spraying, an insurance policy was taken out to cover both weekly sprayings.

The two cities were surveyed and set off by street boundaries by the general chairman so that both cities were completely covered within one week. It was set up so that the business and residential areas were sprayed along the alleys and other areas where flies multiply and breed. Sanitation was emphasized over the radio, and by the distribution of specially prepared fly control pamphlets. Equipment used was hired from two local exterminating companies, Reliable Exterminators. Inc., and Extermital Termite Control, Inc. This equipment consisted of two 15-gallon Bean gasoline-driven sprayers, one 50-gallon Bean gasoline-driven sprayer, one 100-gallon gasoline-driven sprayer mounted in a truck, and two 8-gallon tank sprayers driven off the motor of an automobile.

Material used was 50% DDT Wettable Powder in 50 pound sacks, brought from Rohm and Haas Co., Chicago, Illinois office. One week delivery was secured on this material.

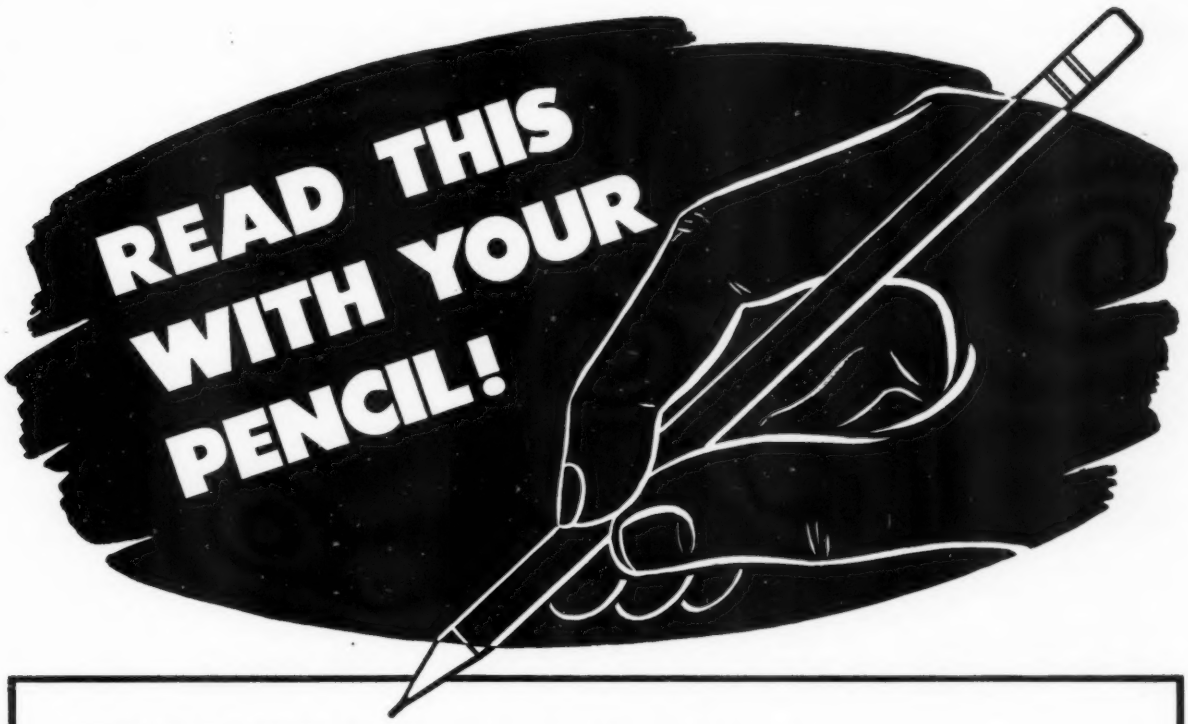
The method of approach was to follow a definite, planned program. Each day was set to cover one-fifth of each city. Each day was assigned to volunteers of the service clubs. Monday was designated as Rotary Day, Tuesday as Kiwanis Day, Wednesday as Lions Day, Thursday Exchange Day, and Friday as Optimus Day. Members of service clubs were assigned to each truck with a professional PCO who directed the actual spray equipment. In addition to the spraying of the two cities by service clubs, Purdue University coordinated its spray program with ours, so that the entire city areas were covered within one week. We set as spraying dates July 26 to July 31 first week and August 30 and September 4 for the second week.

The sprayers were mounted on small one-half ton trucks, (these trucks were supplied by business member volunteers and the two cities) and the sprayers were blocked so they wouldn't spill or rock back and forth. The DDT wettable powder was mixed at the rate of 50 pounds per 100 gallons of water, which gave us a 5% spray. The DDT was kept aggitated all the time by the gasoline motors of the sprayers, to keep the spray in even suspension. On each truck was placed one PCO who knew how to run the equipment and mix the materials. Four trucks were used each day, two in the morning and two in the afternoon.

We sprayed alleys, fences, garbage cans, dumps, bricks, walls, stock yards, loading docks of grocery stores, loading docks of stock yards and fruit dealers, high grass areas, breeding resting and feeding places to kill flies and prevent them from breeding. The trucks drove at the rate of 5 miles per hour. Two 15-gallon Bean sprayers were mounted so as to be able to spray from each side of the truck. Truck upon which the 100-gallon sprayer was mounted had two hoses so as to spray both sides. The spraying was done from the back of each truck, except when the dumps and stockyards were sprayed, then we had to spray on foot.

The Boy Scouts were put to work weighing and packing DDT WP in 6 and 16 lb. bags, these were measured out to get the correct amount necessary. The bags were put on each truck so that they had a load for a quarter of a day.

The actual cost which included materials, labor, insurance for both weekly spraying came to $1367.65.



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What It Takes to be an Aborist

(from page 22)

the Western Chapter in California, the Southern Chapter in Florida, the Mid-Western Chapter in Chicago, and the Ohio Chapter in Columbus. The National Arborist Association does for the arborist what the National Pest Control Association does for the PCO.

There are several state organizations which hold annual meetings and disseminate shade tree information. The Connecticut Tree Protective Association, New Jersey Federation of Shade Tree Commissions, Michigan Forestry and Park Association, and the Colorado Forestry and Horticulture Association are of this type.

The publications of the Agricultural Experiment Stations the Federal Bureau of Entomology and Plant Quarantine, and the Division of Forest Pathology of the U.S.D.A. contain much information on some phases of tree care.

After stuying all the available literature one still needs practical experience before he can operate a satisfactory tree service company. That practical experience can best be obtained by working with an experienced company. Tree work is highly competitive and it is seasonal. Arborists have difficulty in maintaining year around balanced employment for their personnel. I know a great many tree men. None have become very wealthy from their profession. Many think that if they had worked as hard at something else that they would have made much more money. They are in tree work because they like it and they love trees. If you would still like to go in the tree business, good luck to you, but in fairness to the trees please learn what it is all about before you start, for only God can make a tree.

---

2 Million Ants by Air

D. Hornaday, Los Angeles "ant king," recently shipped two million ants by air to a Minneapolis ad agency to be used in sales promotion.

PATENTS
RELATING TO PEST CONTROL

BY

DR. R. C. ROARK

U. S. Department of Agriculture

2,449,533 (Sept. 14, 1948; appl. July 8, 1947). SYNERGISTIC INSECTICIDAL COMPOSITIONS. Edward R. McGovran, Hyattsville, Md., Elmer L. Mayer, Anaheim, Calif., and Florence B. Talley, Philadelphia, Pa. — United States of America as represented by the Secretary of Agriculture. — An insecticidal composition comprises nicotine and phthalonitrile as a synergist therefor.

2,456, 324 (Dec. 14, 1948; appl. July 25, 1945). INSECTICIDE DISPENSER. William L. Roessner, Denver, Colo.

2,456,452 (Dec. 14, 1948; appl. May 8, 1946). 2-CHLOROINDONE. Nelson V. Seegar, Cuyahoga Falls, Ohio. — Wingfoot Corporation, Akron, Ohio. 2-Chloroindone may be used as an insecticide and is particularly useful as an insecticide when diluted with an inert carrier, as, for example, deodorized kerosene.

2,456,586 (Dec. 14, 1948; appl. Dec. 3, 1946). 2-BUTOXYETHYL FLUOROACETATE. Ingenuin Hechenbleikner, Norwalk, Conn. — American Cyanamide Company, New York, N. Y. — 2-Butoxyethyl fluoroacetate possesses insecticidal, rodenticidal and fungicidal properties. It may be prepared in good yield by reacting together ethyl fluoroacetate and 2-butoxyethanol in the presence of p-toluenesulfonic acid.

2,456,731 (Dec. 21, 1948; appl. Dec. 4, 1943). BIRDPROOFING. Julius Stanley Peles, New York, N. Y. — This birdproofing structure may be shipped in knock-down form.

2,460,792 (Feb. 1, 1949; appl. Oct. 3, 1949). ORGANIC MEDIUM FOR THE PRODUCTION OF AEROSOLS. Arthur C. Pabst, Douglaston, Albert E. Griffiths, Port Washington, and Robert B. Killingsworth, Douglaston, N. Y. — Socony-Vacuum Oil Co. — The particles in an insecticidal fog produced by a thermal aerosol generator are regulated by mixing a low boiling oil with a high boiling oil.

2,460,861 (Feb. 8, 1949; appl. Jan. 18, 1945). LIQUID SPRAYER. Harold G. Walters, United States Army, Richmond, Ind.

2,460,865 (Feb. 8, 1949; appl. Dec. 14, 1944). MANUFACTURE OF TRICHLOROMETHYL DIARYLMETHANES. Charles Eugene Wilson, Jr., Denver, Colo. — E. I. du Pont de Nemours & Co., Wilmington, Del. — A process for the manufacture of DDT comprises condensing a chloral yielding compound with monochlorobenzene in the presence of both sulfuric acid and an added quantity of monochlorobenzene sulfonic acid.

2,461.149 (Feb. 8, 1949; appl. April 30, 1946). GARMENT HANGER. Joseph E. Ericson, Kensington, Conn. —This device is provided with means whereby moth balls may be readily positioned therein and removed therefrom as desired.

2,461,492 (Feb. 8, 1949; appl. March 19, 1946). PRODUCTION OF ACRYLONITRILE. Erwin L. Carpenter, Riverside, and Harold S. Davis, Greenwich, Conn. — American Cyanamid Co., New York, N. Y.

2,461,611 (Feb. 15, 1949; appl. March 3, 1947). GUN FOR SPRAYING POWDER. David L. Lott, Denver, Colo.

2,461,852 (Feb. 15, 1949; appl. Feb. 22, 1945). STABILIZATION OF DDT. Gustav A. Stein, Plainfield, and Max Tishler, Rahway, N. J. — Merck & Co., Inc., Rahway, N. J. — A process of stabilizing DDT comprises heating an aqueous mixture containing molten DDT and less than about 0.5%, based on the weight of the DDT, of a weakly basic compound at a temperature of approximately 105° C., thereby evaporating the water and forming a substantially homogeneous liquid mixture of the other components, and cooling to solidify said mixture.

2,462,057 (Feb. 22, 1949; appl. Feb. 3, 1947). METHOD OF PRODUCING HEXAETHYL TETRAPHOSPHATE Howard Adler, Flossmoor, Ill. — Victor Chemical Works. — A method of producing hexaethyl tetraphosphate comprises reacting not less than three moles of diethyl ether per two moles of phosphoric anhydride at from about 50° to 90° C. for a sufficient period to effect an intermediate exothermic reaction, cooling to maintain the temperature within said range, and then at the end of the exothermic reaction period heating at from about 90° to 110° C. under superatmospheric pressure for a period of time sufficient to form a substantial proportion of the tetraphosphate.

2,462,419 (Feb. 22, 1949; appl. Jan. 28, 1949). SPRAY GUN. Donald J. Peeps, Toledo, Ohio. — The De Vibiss Company, Toledo, Ohio.

2,462,433 (Feb. 22, 1949; appl. May 15, 1946). PREPARATION OF ORGANIC THIOCYANATES AND ISOTHIOCYANATES. Norman E. Searle, Wilmington, Del. — E. I. du Pont de Nemours & Co., Wilmington, Del. — A process of preparing organic thiocyanates and isothiocyanates comprises reacting together an organic halide having a relative reactivity of at least 0.5 in comparison with n-butyl chloride as 1.0 and selected from the class consisting of organic chlorides, bromides, and iodides, an alkali metal cyanide, and an excess of sulfur over that stoichiometrically required by said alkali metal cyanide in an oxygenated organic solvent selected from the class consisting of the lower aliphatic alcohols having from 1 to 5 carbon atoms and aliphatic ketones having from 3 to 7 carbon atoms, and isolating therefrom a member of the class consisting of organic thiocyanates and isothiocyanates.

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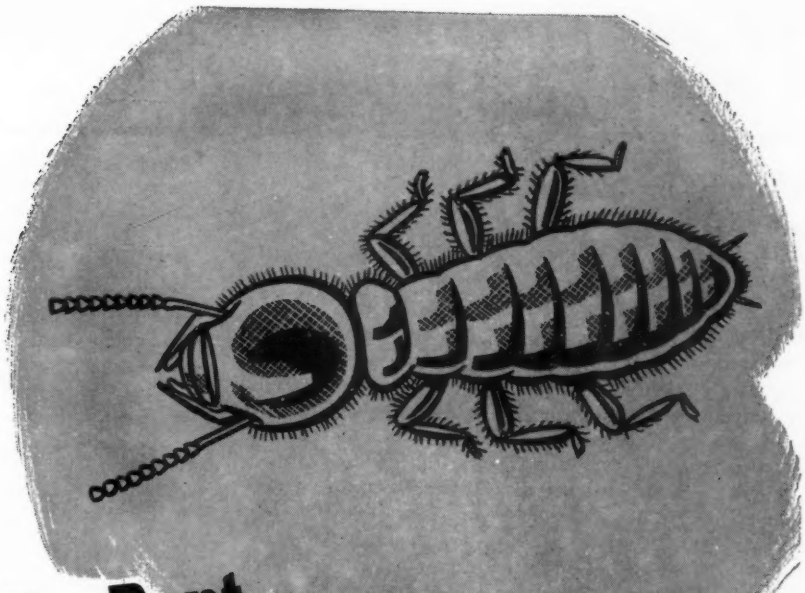

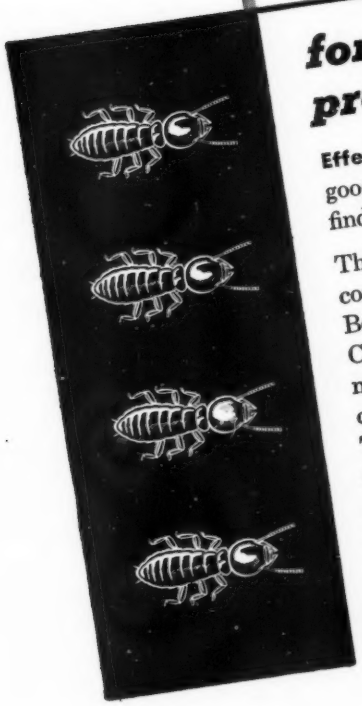

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BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

COMMENTS by the Editor

House Resolution 207

CONGRESSMAN KEEFE recently submitted House Resolution 207 for consideration of the 81st Congress. The proposal is to create a seven-man House committee for the purpose of studying the nature, extent and use of pesticides in this country and their effects upon the nation's health when used in agriculture and in food processing. The resolution reads that the committee can "require by subpoena or otherwise, the attendance and testimony of such witnesses and the production of such books, records, correspondence, memoranda, papers and documents, as it deems necessary" to facilitate the investigation it would make. The committee would be authorized to conduct full and complete investigations and subpoenas may be issued under the signature of the committee's chairman or any member of the committee designated by him.

Even though the general alarm concerning the hazards of insecticides has calmed a bit, the concern of our legislators rests upon the fact that, regardless of cautions printed on the labels, it is possible for the unthinking person to do whatever he wishes with the pesticide he has at the moment. There is nothing to stop an individual from doubling or tripling the recommended concentration of a mixture if, in so doing, he *thinks* he'll be *sure* to get effective results.

There is other evidence that new bills in State legislatures are developing out of a demand for the protection of the public in the sale and use of pesticides. It is far better for an industry involved in problems of public relations and responsibilities to be so adequately self-policed that they will reduce the opportunity for legislative regulation. Is it too late?

Not Too Early

OCTOBER may seem many months off, but there's only August and September before the big NPCA - Convention month and PCOs from all over the country will make their annual trip to the industry's yearly meeting. It's to be held in California at Los Angeles' Biltmore Hotel this time and, since that state is celebrating its centennial, the theme for this, the National Pest Control Association's 17th convention, will be "A Century of Pest Control." Mark the meeting dates, October 17, 18 and 19, on your calendar, add a couple of days on each side, and plan to combine business with pleasure to make this the trip you've always wanted to make to "The Land of Sunshine." Why not make it a family affair?

The full program will be announced shortly, but highlight of this year's meeting will be the presentation of the complete report of the NPCA's Termite Committee which has been working with every section of the country to draw up regional recommendations and standards for termite work. That alone should be worth the trip.

Reservations are already being accepted, so it's not too early to make transportation and hotel reservations now. There's to be a special PCO-sightseeing train heading west and stopping at Carlsbad Canyon, Grand Canyon and Phoenix before reaching Los Angeles. Write Mr. Martin Meyer at 213 S. 10th Street, Philadelphia 7, Pa., for full information on that. No matter how you plan to go, make plans to attend.

Point Well Taken

WE THINK Dr. S. A. Rowher, assistant chief, B.E.P.Q., U.S.D.A., made one of the most sensible statements we've heard regarding the use of DDT at the recent meeting of the recent Chicago convention of the N.A.I.D.M. (now renamed the Chemical Specialties Manufacturers Association, Inc.). "I know of no single chemical which has been studied from the standpoint of formulation as has DDT," he commented. "If wisely used, DDT has a prominent place in the household insecticide field and to classify it as hazardous or unsafe is not entomologically or scientifically sound. I hope you will begin praising this material for what it is, but with all due regard to its hazards when used where foods are involved." Much of the misunderstanding all over the country, he said, has come about from association of thought with the food contamination phase of this problem.

In other words there is no need for the public to become hysterical whenever they hear DDT is being used just because they've read some of the timely warnings the Department of Agriculture has given in connnection with the use of this insecticide in the dairy industry. There are many places where DDT *can* be used safely. Earlier reports of DDT's toxicity to many insects still hold. All of this goes to prove DDT is still a valuable chemical for pest control operators to use, if used properly.

The industry can thank men like Dr. Rohwer who interpret federal warnings in their true meaning and clarify much of the misunderstanding that has arisen from some of them.

Biggest Competitor?

AS SOON AS the operator stepped into the building, he could tell a tough competitor had beat him to the account! His nose told him so. Cat manure has its own sickening smell and doors don't hold back the odor, nor the filth. Thousands of places swear by cats and refuse to trade them for the service of a PCO. What is our industry's answer to this soft-footed, bewhiskered competitor?

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MISTMASTER Portable Electric Sprayers give perfect and complete penetration. In this patented sprayer, insecticides are first broken into minute particles by a rotary compressor, then warmed above room temperature, and finally, atomized completely by tremendous pressure at the nozzle.

The result is complete penetration. Insecticide floats longer in the air, settles gradually into every possible opening in complete strength, and does a thorough and effective job of coverage.

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PCO NEWS

William B. Herms

News of the death of Professor William B. Herms on May 9th, arrived too late to be included in our June issue. Dr. Herms, an honorary member of the NPCA, was stricken with a heart attack and died at the age of 72. A veteran of both World Wars, he had been head of the department of entomology and parasitology at the University of California before his retirement in 1943. Professor Herms played an important part in the organization of PCO conferences at the University of California.

Studier Forms Company

Harry Studier, past president of the Ohio Pest Control Association, and owner of the Guarantee Exterminating Co. in Cleveland, has organized a company to supply the industry with equipment. Called the Superior Equipment Co., at 3204 St. Clair Ave., Cleveland, Ohio, the firm now has distributorships for Wheat spotlights and chargers, Syntron electric hammers, electric drills and star drill supplies. As needs develop, Studier says he will add other special equipment for pest control and termite operators.

CALENDAR OF MEETINGS

New Jersey Pest Control Assn. Meeting, Rutgers University, New Brunswick, N. J., Aug. 15.

National Association of Sanitarians Conference, Alexandria Hotel, Los Angeles, Cal., Aug. 16-18.

Minnesota Public Health Assn. Conference, Niccolet Hotel, Minneapolis, Minn., Sept. 30.

National Pest Control Assn. Convention, Biltmore Hotel, Los Angeles, Cal., Oct. 17-19.

International Assn. of Milk and Food Sanitarians Conference, Deshler - Wallick Hotel, Columbus, Ohio, Oct. 20-22.

Municipal Public Health Engineers Conference, Hotel Statler, New York city, Oct. 23-24.

Better Business Bureau meeting with PCOs. (Facing camera from left to right) Homer Lyne, Elmer Morgan, Dr. C. A. Trimbos (Protex Service) Clell Smith (Dallas Exterminating) Thomas J. Nolan (Texas Exterminating), and H. O. Abel (Abel Exterminating). Man with back partially to camera is G. Duffield Smith, V. P. Better Business Bureau of Dallas, Texas.

50 Years Together

C. E. Ryder, secretary-treasurer of Pest Control Technicians Ltd., Hamilton, Ontario, and Mrs. Ryder celebrated their fiftieth wedding anniversary, June 7th, with their two children, Mrs. B. O. Coulthart and Henry E. Ryder. They were married in Danbury, Conn., when Mr. Ryder was mustered out of the army after the Spanish-American War. He is a past president of both the Ontario and Canadian Pest Control Association.

New O'Reilly Heiress

Newest addition to the Bill O'Reilly's of the Plunkett Exterminating Co., Minneapolis, Minn., is Patricia Ann, born April 24th. This makes the fourth for Mr. and Mrs. O. R. who introduced little Patricia to sons, Pat, Mike and John.

Washington Calls Mrs. Marston

Mrs. Jessie Marston, the other half of the Cal-Pro Pest Control Co., Pasadena, Cal. is spending some time with her daughter in Washington, D. C. Les Marston says he is able to run the place without Mrs. M., but we guess she'll be the best judge of that when she returns.

BBB and PCOs Cooperate

The Better Business Bureau of Dallas, Texas and prominent PCOs in that city have been cooperating for more than three years and have virtually eliminated all false claims and malpractices in pest control in Dallas. The picture above shows one of a number of typical meetings where problems and abuses are worked out.

At the present time, the BBB is sponsoring a series of ten minute radio broadcasts once a week, prepared by the local pest control industry and designed to inform the public of good practices in this field and better enable the homeowner to protect himself against the operations of the fly-by-night operator.

PCO-Ark. Board Member

Wordie Evans, Evans Laboratories, Inc., Little Rock, has been elected to membership on the Arkansas State Plant Board with headquarters at Little Rock. NPCA member Evans was elected to a two-year term by the Arkansas Pest Control Association. Prominent in PCO work, Evans has his main office in Little Rock and a branch in Fort Smith, Arkansas.

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For best application of Insecticides, Deodorants, Disenfectants, Solutions, Etc.

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Develops 300 to 500 pounds nozzle pressure. Produces billows of penetrating fog spray.

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No leather or rubber plungers to wear out.
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It usually takes a better product to do a better job . . . and that's true with Lucide A-20. Lucide is a true colloidal emulsion of refined grade Chlordane, developed and produced to give most efficient results for the PCO.

Lucide is absolutely fireproof, in solution or concentrated form; doesn't need to be shaken or agitated; won't clog nozzles or strainers; does a residual job that lasts and cuts down call-backs.

Buy LUCIDE today . . .
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1 Gal. Lucide A-20 plus 9 gal. water makes 10 gal. 2% refined grade Chlordane — residual formulation.

1 Gal. Lucide A-20 plus 19 gal. water makes 20 gal. 1% refined grade Chlordane — for maintaining residual effect on call-backs.

1 Gal. Lucide A-20 plus 39 gal. water makes 40 gal. ½ of 1% refined grade Chlordane — animal parasite formulation.

1 Gal. Lucide A-20 plus 79 gal. water makes 80 gal. ¼ of 1% refined grade Chlordane—for general outdoor use; gardens, crops, etc.

NEW LOW PRICES

55 gal. drums $4.25 per gal.

5 gal. container $4.75 per gal.

1 gal. container $6.25 per gal.

All Prices F.O.B., N.Y.C.

Pest Control Equipment Co.
47 West 43rd Street **New York 18, N. Y.**
VAnderbilt 6-5390

Dow Vacancies Filled

Three posts were left vacant at Dow Chemical Co., Midland, Mich., when Dr. Willard H. Dow died in a plane crash recently. These posts, board chairman, president, and general manager, have been filled respectively by: Earl W. Bennett, Leland I. Doan, and Dr. Mark E. Putman.

Bennett went to work for the company in 1900 for Dr. Dow's father, founder Herbert H. Dow. He became assistant secretary-treasurer in 1905, a member of the board in 1927 and company treasurer in 1930. Company finances still will be under his direction.

Doan, the new president, is a brother-in-law of the late Dr. Dow. He started with Dow in 1917 as a research assistant, later moved up to assistant sales manager, in 1922, general sales manager in 1929, director of sales, in 1945, and has been on the board since 1935.

Putnam, new general manager, has served with Dow since 1915. He began as a research chemist, moved up to production manager, became a director in 1941 and vice-president in 1942.

It is reported there will be no changes in the company policy.

Cal. Delegation Meets

A delegation of PCOs from Southern California made the trip to Sacramento, Cal., May 5, in the interest of legislative revisions of the Structural Pest Control Act, now under consideration by the state legislature.

Those who made trip were: Hugh C. Smith, president of the California association, Bob Mesecher, treasurer of the Cal. association, Karl Hassler, secretary of the Los Angeles district of the association, G. M. Culton, a local PCO, Clifford Hodel, of the Structural Pest Control Board and J. F. Graham, registrar and secretary of the State Structural Pest Control Board.

While at Sacramento the delegates reviewed the tentative NPCA convention program to be held this coming October, in Los Angeles, with NPCA prexy, Harold Montgomery.

Howard Olson

Olson to Marry

A last-minute flash from Chicago, brings the news that Howard E. Olson, field representative for Chapman Chemical Co., is to be married on July 16th to Miss Bettye V. Johnson, 5129 Woodlawn Boulevard, Minneapolis, Minn., at Lake Wokomis Lutheran Church in that city. It's to be a formal affair with tuxes and all and the groom informs us that semi-lethal doses of bourbon fortified with a 1 to 10 concentrate of Chapman's Penta Preservative taken orally will be the center of attraction at the refreshment table. After the ceremonies, the couple will spend a two-week honeymoon at Lake Louise, Alberta, Canada.

Sanitarians to Meet in L. A.

The thirteenth annual convention of the National Association of Sanitarians is to be held August 15-18 at the Alexandria Hotel in Los Angeles, California. A profitable business program has been planned in addition to a field trip through Hollywood where arrangement have been made for a tour through MGM studios. Further information can be obtained by writing the Association at 1256 West 7th St., Los Angeles 14, Cal.

Mill Creek Moves

Mill Creek Products Co., Inc., insecticide manufacturers, has moved its New York office to new and larger quarters at 50 West 46th in the same city.

Planetary Adds Kaberg

Russell A. Kaberg, former assistant development manager for Wyandotte Chemical Corp., has accepted the directorship of research and development at Planetary Chemical Co., Creve Coeur, Mo., according to a recent announcement by Planetary's president, A. H. Winheim. Kaberg was formerly associated with DuPont and Monsanto and is reported to be the holder of many chemical patents. Planetary is said to be enlarging its activities producing emulsifying agents, organic phosphates and leather chemicals in addition to its line of agricultural and pest control chemicals. Bud Feldman is general manager of production for the company.

Enough Light

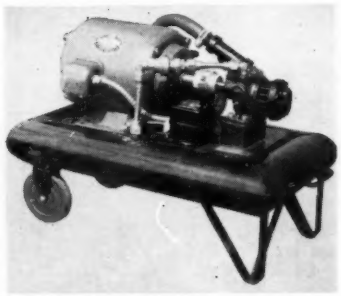
One of the big problems in pest control inspection work has been the inability to get sufficient light in the proper places without using long extension cords which often get tangled in the operator's legs and sometimes cause dangerous short-circuits. The Wheat Rechargeable Spotlight offers one of the best answers to this perplexing problem that PCOs have been able to discover. It gives a 2500 foot, 25,000 candle power light and lasts for over 1,000 hours of operation. It can be carried around, weighs only 95 ounces, and a handy wire stand, plus a leather shoulder strap enable the operator to have the light with him wherever he goes. A lamp-charger is also available so the spotlight can be recharged back in the shop when it is not in use. Wheat Rechargeable Spotlights and lamp chargers can be obtained from Superior Equipment Co., 3204 St. Clair Ave., Cleveland 14, Ohio.

Velsicol Assigns Waymond

Velsicol Corporation, Chicago, manufacturers of Velsicol 1068 Chlordane, has appointed H. O. Waymond assistant to the president. Waymond was formerly in charge of the Chicago office of the Merchants Chemical Co.

For Pressure Treating and Spraying

THE AUTOMATIC



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Doesn't tie up your truck at the job.
Light enough to handle easily . . . weighs 127 lbs.
Recommended for pressures up to 225 lbs.
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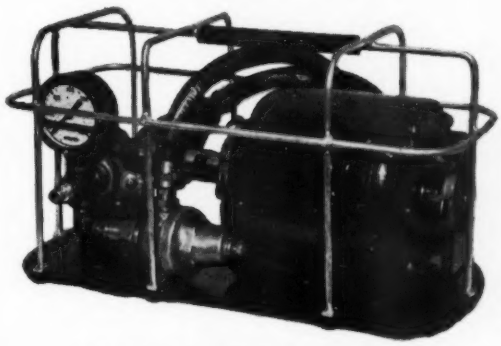

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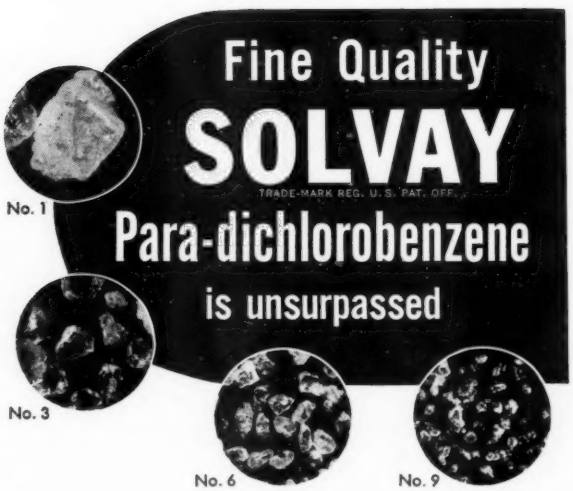

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Ken Harder

Star Tyro

Frank Harder, entomology major at Purdue University and son of Ken Harder, Harder Extermination Service, Hempstead New York, is making a name for himself as a star quarter-miler and anchor man on the one-mile relay team at Purdue. This makes his second year of competition and he promises to be a star in Midwestern track in his senior year. Future PCO Frank, who'll be in good shape to chase after business when he graduates, has been named captain of the Purdue track team for next year.

Mosquito Data for South

"Distribution of Mosquitoes in Third Army Area" is the title of a 72 page booklet written by Virgil I. Miles and Samuel O. Hill and published by the Third Army Medical Laboratory.

Mosquitoes (2,004,626 of them, representing 72 species) were collected in seven Southeastern states during 1942-45, identified, and their collection-locations plotted on the 57 maps included in this work. Collections were made by trained technicians under the supervision of commissioned entomologists and sanitary engineers in the Sanitary Corps. The methods of trapping also are discussed in this report.

Copies of the publication are available free of charge from the Tropical Diseases Section, Third Army Medical Laboratory, Fort McPherson, Georgia.

Hyman Wins In Illinois Appellate Court Decision

In a decision reversing the Superior Court of Cook County, the First Division of the Appellate Court of Illinois on Monday, June 20, 1949, ruled in favor of Dr. Julius Hyman in the suit for ownership of the patent application on Chlordane, well-known insect toxicant. This suit had been instituted by Velsicol Corporation of Chicago.

Title to the Chlordane patent applications has been in litigation since 1946, when Dr. Hyman left his position as Executive Vice-President of Velsicol Corporation and subsequently organized Julius Hyman and Company.

Since 1947 the Hyman Company has been engaged in the manufacture of Chlordane under the brand name, Octa-Klor, at its plant at the Rocky Mountain Arsenal, Denver, Colorado.

"Ironpants" Is His Name

In March we printed a picture of Purdue's Prof. J. J. Davis exhibiting a medieval suit of armor to his entomology class, explaining the similarity between it and the exoskeleton of insects. We've been told the armor, nicknamed Sir Archie Ironpants, was a gift of the NPCA at the Purdue conference about five years ago. Prof. Davis explains to his beginning entomology students that the skeleton of an insect is made up of overlapping external plates, just like the armor of the early knights. In both cases complete protection is provided while freedom of movement is retained. Fledgling entomologists are able to grasp a difficult principle by a brief study of the remarkable similarities.

Sir Archie is an excellent example of the art of armor making. The helmet is probably an original from the 16th century and the rest of the suit was made by an armorer about 150 years ago in the style of the 16th century. At the famed Higgins Industrial Museum in Worcester, Mass., where Archie used to live, a value of $1000 was placed on him a few years ago because of the excellent workmanship.

PCO NOTEBOOK

by

J. R. Gross

The One That Got Away

In selling roach-control service it is often very valuable to know how an infestation can grow from month to month. Usually the situation calls for discussion demonstrating the speed with which roaches multiply. However, it isn't unusual to run across a case where the opposite is true. I mean where it is important to know that they don't multiply as fast as some people may tell.

For example not long ago I inspected a supermarket. I estimated the population to be at least 10,000 German roaches and two to three thousand Oriental roaches.

The manager said to me, "Gross, until two months ago we didn't have a roach. Then one day we noticed a couple run out of a beer case just delivered. We killed one, but the other got away.

So with cold mathematics I proved that it was impossible for such a heavy infestation to blossom from one roach in just two months. The contract wasn't big; but it didn't get away.

German roaches produce 2-3 generations a year. Oriental roaches only about one generation per year. My experience has been that it usually takes close to a full year to produce a really heavy German roach infestation. Oriental and American roaches may take five years before they overrun an establishment.

The table below will give some idea how the population may grow from a single pregnant German roach:

1st Mo.	2nd Mo.	3rd Mo.	4th Mo.	5th Mo.
31	61	91	121	601

ONE LOOK

And You *See* the Difference
With ACME
Full-Vision Gas Masks . . .

For positive protection against gas hazards without sacrifice of vision, it pays to specify Acme Gas Masks. Acme's larger lenses give you full vision. Another exclusive difference is Acme's Dead Air Check Valve. Acme canisters protect against smokes, mists, dusts, fumes, organic vapors, acid gases, carbon monoxide, ammonia, etc. Write for illustrated bulletins.

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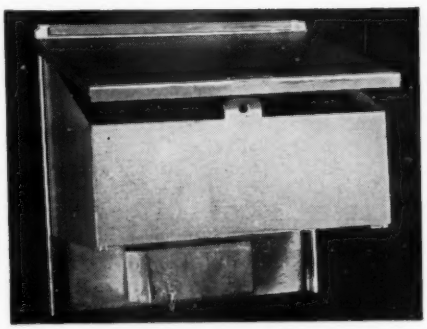

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6-12 stations $2.00 each
12 or more $1.75 each

MICE-GLUE

GETS MICE LIKE FLYPAPER GETS FLIES
7½ lbs. $5.00 25 lbs. $13.50 100 lbs. $45.00

BIRD-REPELLENT

Keep Pigeons, Starlings and Other Birds from Buildings
7½ lbs., 75c lb. 25 lbs., 65c lb. 100 lbs. 60c lb.

PEST CONTROL CHEMICALS CO.

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Make Money With CUSTOM Spraying

Custom Spraying is a profitable business on either a full or part-time basis. Kill weeds; protect shade and fruit trees; sanitize barns, poultry houses; rid homes, farms, resorts of insect pests; spray livestock; whitewash. These are just a few of the jobs that a Custom Sprayer can do profitably with John Bean specialized sprayers.

Pest Control is in the News

Hundreds of communities know that spraying rids them of insect pests. You can interest men in starting a Custom Spraying business, or open a Custom Spraying service in your own organization. John Bean has a free Custom Spraying Manual that tells how to get into this business — what the big demand is for this service. Write, or use coupon today.

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John Bean has the complete line of sprayers:

- output from 3 to 60 gallons per minute
- pressures all the way to 600 lbs.
- models can be skid mounted, trailer type, or small portable unit.
- engine powered or power take off
- complete accessories

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Send free Custom Spraying Manual No. 72 that outlines advantages of Custom Spraying business.

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New FARM SPRAY GUIDE FREE! Write for your copy. Tells what, when, how to spray!

"No One Pesticide Cure-All" Says Rohwer at NAIDM Meet

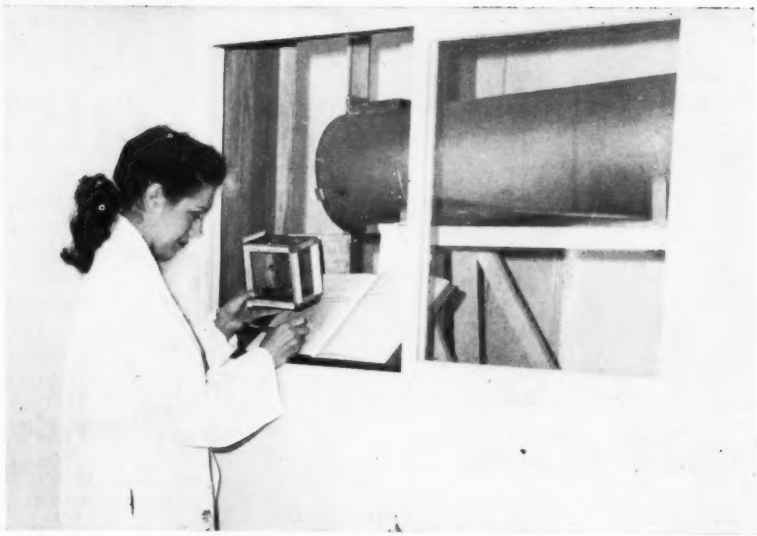
Manufacturers of insecticides should begin exploring the possibilities for developing specialized products for control of household pests, Dr. S. A. Rohwer, assistant chief, Bureau of Entomology and Plant Quarantine, U.S.D.A., declared in a Chicago speech recently. The public, he said, wants to have a one-job insecticide, but "We never think of curing all diseases with the same bottle of medicine. Neither should we think of controlling all insects with one formula."

The eminent Washington scientist spoke at the convention of the Chemical Specialties Manufacturers Association, Inc., new name adopted with the reorganization of the former National Association of Insecticide and Disinfectant Manufacturers.

Dr. Rohwer took issue with proponents of the newer types of insecticide applicators, such as mist blowers, fog generators, gas propelled and heat generated aerosols. We've gotten to think he said, that these can be used with impunity and this has had a bearing on the unfavorable reaction of the public to the promiscuous use of insecticides.

Methods of application should be re-evaluated, he declared. The one big thing that chlorinated hydrocarbons have contributed to agricultural and household pest control is their residual effect. But fine dispersions, he said, are not a way to deposit lasting residues, since the compounds that do the job do it by settling out of the mist clouds. This sediment, he claimed, can only settle on level surfaces, not on ceilings or vertical walls. "Let's use the chlorinated hydrocarbons," he appealed, "in such a way that they will bring about good pest control. And use them for purposes for which they have a special forte, remembering that it is the residual effect that is most important."

There is also need for more attion to the toxicology of insecticidal chemicals, as well as to improvement in their use, Dr. Rohwer asserted. "I fear we're not all as concerned as we should be," he remarked, "with the toxic effects of the finished insecticide. Synergists have come into use but study of their effects has usually been confined to a single or related product. If synergism occurs in one product it may occur in others and more attention is needed to the toxic effects of our combinations of chemicals."



Getting the test results is an important step in the development of new spray formulations. Picture above shows comely insecticide research technician, Betty Croy, recording the dead flies at the completion of a test of California Spray-Chemical's new Isotox formulation developed for PCOs.

Reporting to the convention on use of DDT for fly control, Dr. E. F. Knipling, chief, Division of Insects Affecting Man and Animals, U.S.D.A., remarked that in tests by federal investigators to determine how contamination of milk comes about from use of DDT in barns, where no special precautions were taken to protect feed troughs from the spray, analysis of milk in four barns, two days after application, revealed from 0.5 to 1.5 parts per million of DDT in the milk. In other barns, where feed troughs were covered before spraying, analysis showed "practically no DDT present" or "no significant DDT in the milk," he stated.

"These preliminary data," said Dr. Knipling, "indicate that it may be possible to apply DDT in dairy barns without significant contamination of the milk. They also prove that we must be careful in applying the insecticide."

He told also of tests to determine if cattle could inhale DDT which had flaked off walls. Results, he stated, show that inhalation has no significance in contamination of milk. Other tests to determine if contamination from the operator is possible were also negative, he further said.

Previous recommendations of methoxychlor as the only insecticide for use in dairy barns still stand, he emphasized.

In a symposium on aerosols, T. B. Welsh of Gulf Oil Corp., Pittsburgh, Pa., stressed the need for discontinuing claims of "miracle" ingredients in favor of giving the customer the facts, to bring the aerosol business down to a sound basis. Manufacturers, he said, should be interested in maintaining the quality of their product, giving specific directions on containers, and advertising conservatively, using only factual statements.

Beetles Book

J. Gordon Edwards, a graduate student in Entomology at Ohio State University, has recently published a new book entitled, "Coleoptera or Beetles East of the Great Plains." Lithoprinted with 186 pages and 23 plates, the book sells for $3.50 and can be ordered direct from the author at 392 Prairie Ave., Wilmington, Ohio.

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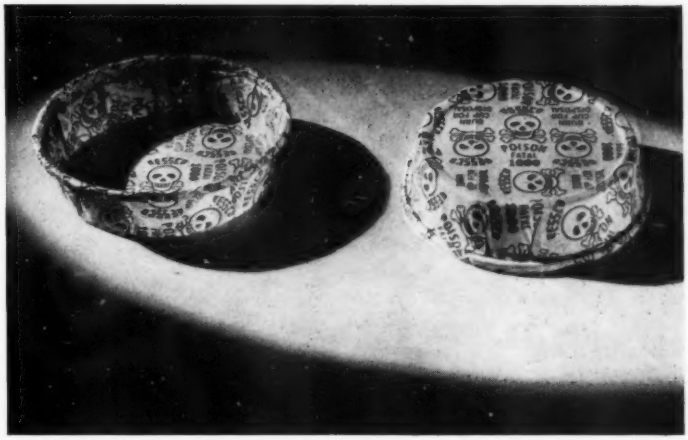
The EESSCO Saf-T-Cup was the best that could be made . . . but after receiving many comments from the National Pest Control Association, U.S. Department of Interior, City and Governmental Health Agencies and PCOs who have used the EESSCO Saf-T-Cup, we have now developed a better cup that will meet with everyone's approval. This cup is not the usual improvised product which the PCO has learned to accept whenever he needs anything, but a product developed and manufactured especially for the PCO — the result of intense research and development.



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- Has triple fold lip which keeps cup in shape until liquid completely evaporates.. Not single fold lip which made cup shrivel after 24 hours.
- All sides of cup carry printing and can be used for colored liquid and solid baits of all kinds. Previously solid baits or colored liquids covered Poison Legend.
- ¾ oz. size is recommended for maximum safety. 1 oz. size is considered dangerous for many uses.
- Comes in new, hard pasteboard, handy-dispenser box. Keeps box until all cups have been used. Old box wasted many cups by crushing and spillage.

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10M to 20M	2.25 per M
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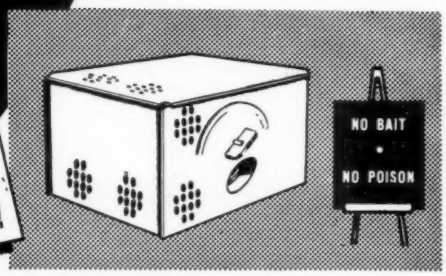

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- WATER PUMP
- POWER PLANT

This "Mighty Mite" of a sprayer shoots a driving stream up to 25 feet, or adjusts to a fine mist. Sprays a gallon-a-minute at pressures up to 150 lbs. Weighs only 75 lbs. Only 18 inches wide. Wheels like a baby carriage! Works like a charm!

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New Du Pont Weed Killer

E. I. du Pont de Nemours & Co. has developed a salt of trichloroacetic acid, TCA claimed to be effective against such weeds as Johnson, Bermuda, quack grasses and prickly-pear cactus.

It is noncombustible, leaves soil sterile for only a short time, and can be mixed with other weed weapons, according to reports. TCA gives a wider choice of weed-killing weapons: 2,4-D for broad-leafed planats; Ammate for poison ivy and other woody perennial weeds; and TCA, which reputedly kills many other weeds the other preparations don't touch.

Prescription for the new killer is: 200 lb. per acre for Johnson grass; 60 lb. to 200 lb. per acre for Bermuda and quack grass.

Withdraw Ark. 2,4-D Bill

Bill No. S.B. 233, introduced by Senator Donald Poe at the request of the Arkansas State Plant Board authorizing the Board to regulate the use of 2,4-D and other dangerous poisons, has been withdrawn. The bill was approved by the Senate Agricultural Committee, but there appeared to be no general demand for its passage and there was some opposition, so Poe withdrew it before it was brought to a vote.

Soloway Consulting Lab

S. B. Soloway, former research chemist for Julius Hyman & Co., Denver, Col., and the Bureau of Entomology and Plant Quarantine, Beltsville, Md., has established consulting laboratories at 476 Milford St., Brooklyn, N. Y. We're told Soloway pioneered in the field of synthetic pyrethrum and made contributions to work on chlorinated organic compounds.

Hyman Supplement On Grasshoppers

Julius Hyman & Company, Denver, Col. announces that their newly revised Technical Supplement No. 201-B, "Direct Control of Grasshoppers with Chlordane," is available without charge, from the company.

Tifa for Fly, Mosquito Control

According to a news story in a recent issue of the *Buckeye*, publication of the Columbus, Ohio Entomological Society, Dr. H. K. Steckel, Tornado Mfg. Co. conducted some extensive experiments in Bexley, O., last summer in the use of a Tifa for fly and Mosquito control. He says very effective mosquito control and satisfactory fly control was obtained on a city-wide basis in Bexley throughout the summer months of 1948 using 5% technical DDT in kerosene. The material was applied as a dry fog.

Applications averaged one every two weeks from June 7th to September 2nd. Total gallons of solution used was 5110 and 194½ hours of actual operating time was required to make the applications. Total DDT technical applied for the season was 1.2 pounds per acre and total cost was aproximately $2.20 per acre of area covered.

Use PRENTOX
CHLORDANE (Concentrates & Dust)
PYRETHRUM (Powder & Extract)
RED SQUILL (Powder & Liquid)
DDT PRODUCTS
For PEST CONTROL

MICRO-MESH 50% DDT POWDER

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(Portable)

With Built-In Illumination!

Magnifiers show up clearly small objects and details of specimens and their structures that are just beyond the range of normal vision.

Pest Control Operators will find these Magnifiers very useful for identification and study of Insects, Eggs, Etc.

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20-Power and 40-Power Models also available.

Write for **DATA M-49-PC** We pay postage if remittance accompanies order.

	Battery Control	Plug-in Control
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7-Power, Non-Achromatic	14.85	16.85
7-Power, Achromatic	25.85	29.15

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Chlordane, oil concentrate, liquid emulsifiable concentrate, wettable powder concentrate, and ready-to-use liquids and powders.

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Poison Seeds

Pyrethrum and **DDT,** powders and liquids

Paradichlorobenzene

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Rumetan (Zinc Phosphide)
Fortified Red Squill Extract and Powder
Antu and **Antu Tracking Powder**
Thallium Sulphate
Barium Carbonate
Arsenic White

FOR TERMITES

Orthodichlorobenzene, Creosote Oil, Sodium Arsenite Powder, Pentachlorophenol Concentrate

Write for particulars and prices

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GREATER KILL with PENN-DRAKE SOLVENTS FOR INSECTICIDE SPRAYS

INSECTI-SOL Longer float . . . deeper penetration . . . freedom from odor and stain—these are the important features you add to your insecticide sprays when you specify Penn-Drake Insecti-Sol as the base. Excellent for all types of sprays, this 100% volatile base is the perfect solvent for use with DDT solutions or DDT crystals in low concentrations.

SUPER-SOL Whenever fast drying or rapid evaporation is needed, specify Penn-Drake Super-Sol as your solvent. Ideal as a mothicide base, this odorless solvent also is recommended for use in odorless paints, home dry cleaners, DDT residual sprays, metal parts cleaners and in other products requiring a high flash.

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MONTHLY MAGAZINE OF THE PEST CONTROL AND ALLIED SANITATION SERVICE INDUSTRIES

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PCE's **complete** line of material, equipment, and supplies offers the PCO professional material that's high in quality and low in price. Tested, and field proven; you'll work more efficiently — and more profitably — with PCE guaranteed items.

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Unbreakable . . . and Unbeatable.

Write for detailed information on these and other items in PCE's complete line. There's no obligation, of course.

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The First All Food Bait
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ZINC PHOSPHIDE
The Best Mice Killer Ever Made

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A complete bait skillfully blended with choice foods of profen acceptability to HOUSE mice, FIELD mice and RATS. Tested by leading independent laboratories.

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The Makers of
KANT-LIV Rat Paste with Fortified Red Squill and
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MOTH-CHEK is ODORLESS, COLORLESS, STAINLESS. SAVE TIME, MONEY and WORRY.

Every job is guaranteed for 5 years.

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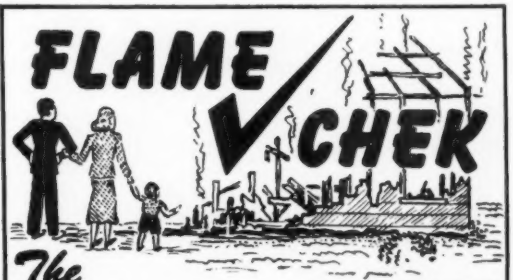

The amazing liquid that STOPS the spreading of Flames

Profits . . . More Profits . . . Extra Profits . . . Any way you look at it. One P.C.O. "FLAME CHEK"ED an industrial plant for $3000. Another "FLAME CHEK"ED an auditorium for $900. Can you use "extra" business like this? FLAME CHEK flameproofs rugs, drapes, upholstery, paper, etc. Applied by Spraying. Approved by Fire Departments in 25 big cities and 3 states.

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ORGANIZATION NEWS...

New Members of Mo. PCA

Two new members were admitted into membership of the Missouri Pest Control Association at its second quarterly meeting held at Columbia, Mo., May 14th. They were: The Ajax Termite Control Co., Kansas City, and Rouff's System of Pest Control, St. Louis.

Sixteen members and three guests attended the meeting which heard Ira Hatfield, pest control consultant, give a complete treatise on the termite, from idenification, habits, and damage to methods of control. Albert Happy, engineer for the Missouri health department, reviewed the proceedings at the May 5th Jefferson City meeting of the State Health Department at which the Association president, A. J. Danella, spoke on rat control and stoppage. Jesse H. Barlow, sanitary inspector of Pluaski County. concluded the program by giving his observations and experiences in fly control in his county.

President Danella announced that it was being planned to hold the next meeting at Kansas City and that it would be a joint meeting with the Kansas group. Exact dates are to be announced later.

Kansas T&PCA Attracts 19

Nineteen members were present at the latest quarterly meeting of the Kansas Termite and Pest Control Association held at the Wareham Hotel in Manhattan, Kansas, May 21st, in spite of a naturally busy season and the fact that some members were sponsoring an exhibit at the Better Homes Show in Kansas City.

Dr. Husse, Kansas Public Health Service, reported on some of the state activities for controlling the fly population in Kansas. Other speakers on the program were Dr. Roger C. Smith, Professor Wilber and Dr. Paul Dahm, all from the department of entomology at Kansas State College.

Operators in states adjoining Kansas and Missouri are invited to attend the next meeting of the association which is to be held in conjunction with the Missouri association. Contact Rynold Shuyler, 3138 State Ave., Kansas City, Kansas, for details.

Ind. PCA Picks Partlow

C. O. Partlow, Reliable Exterminating Co., Lafayette, Ind., was elected president at the May 21st meeting of the Indiana Pest Control Association held at Purdue University. Other officers elected at this meeting were: K. H. Draper, vice-president, and W. S. Gibson, secretary-treasurer.

Folowing the reports given by officers and commitees, the discussion centered on termite problems, with special reference to procedures which the association might take to acquaint home-owners to recognize questionable operators and practices.

After the morning session held at the Union building, the meeting reassembled in Room 12 of the university's Agricultural Hall where, at a cost of approximately $2,500, equipment has been installed for the new four-year PCO curriculum. Prof. John Osmun explained the various uses of the new equipment.

Juniors in the pest control course, Bill Brehm and George Gillmore demonstrated a modified hand sprayer of special value to PCOs which they developed. Other demonstrations included a special piece of equipment for mist sprays, originated by Professor Osmun and his students. The Lawrence Aero-Mist sprayer was also displayed.

The meeting closed with discussions on the need for care in the use of chlorinated hydrocarbons, fly resistance to DDT, Food and Drug Administration regulations, and other phases of insect control.

Next quarterly meeting will be held in August, date to be announced later, at one of Indiana's

(Continued on page 44)

N. J. PCA Protects Customer

Protection for the state's businessmen and property-owners coping with termit control problems was pledged by the New Jersey Pest Control Association through its executive committee, when it met on May 12, at the Hotel Plaza, in Jersey City, N. J. Qualification of termite control operators, by the association, was decided to be the form of protection.

"The PCA will approve only those firms engaged in termite control work which qualify with a proven record of experience, scientific background, knowledge of building construction, adequate equipment and financial responsibility to the public," stated Harry Stucker, secretary of the assocociation, "It is our duty to be sure that the industrialist or home owner who suddenly finds himself with his property endangered can turn with complete confidence to a firm or an individual qualified by the New Jersey PCA."

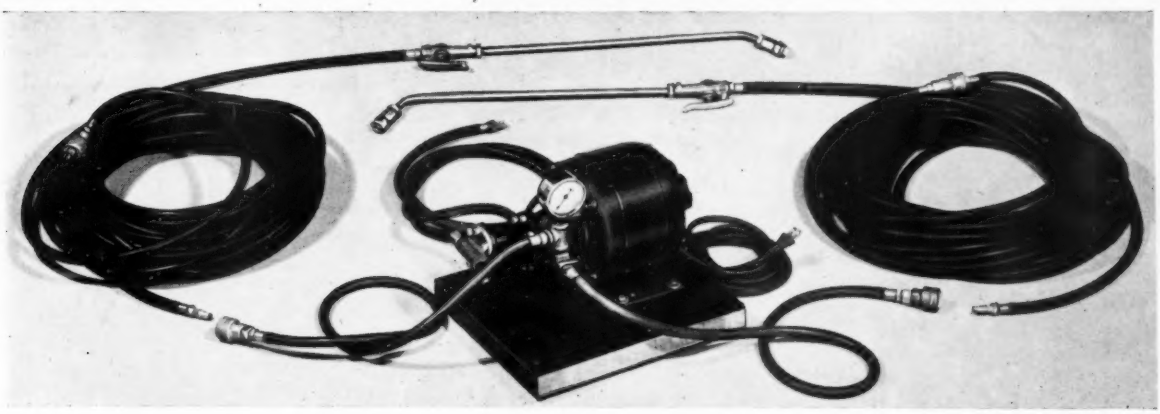
John Medoff, a past president of the organization, said that heretofore the public had found it practically impossible to differentiate between the qualified and the unqualified pest control operator.

"Any property owner who calls upon a termite control operator qualified by the association will be assured that the performance will equal the promise," he concluded.

The committee also completed plans for the statewide gathering of the group at Rutgers University, New Brunswick, N. J., May 26.

EPa. PCA Hears Dr. Obold

Dr. Walter Lord Obold, director of public health and professor of biological sciences at Drexel Institute, was guest speaker at the June 9th meeting of the Eastern Pennsylvania Pest Control Association held in Philadelphia's Robert Morris Hotel. Dr. Obold's subject was bacteria, mold and yeast control. This was a din-



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PCE's electric residual applicator handles jobs easily, efficiently — *PROFITABLY*.

Ideal for large scale work indoors . . . theatres, hospitals, warehouses, locker rooms. Perfect outdoors for shrubs, small trees, lawns, weeds. And use it for termite control work.

Guaranteed for two years in PCO service.

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COMPLETE — ready to plug in and run — with 100 ft. PCE oil-resistant hose; 18" aluminum extension; valve; set of 3 different capacity residual fan pattern nozzles; 6′ Underwriter approved Neoprene oil-resistant cord; 6′ intake hose with strainer; 200 lb. pressure gauge; high-precision gear pump; 110 volt 60 cycle AC motor (DC available on request); supplied with field replaceable hose end adapters and snap-on hose couplers . . .All COMPLETE FOR ONLY $150.00 F.O.B., N.Y.C.

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PYRETHRUM—Pyrefume Super 20 • Powder • Emulsifiable Pyrefume

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FOR RODENT CONTROL—Dethdiet Red Squill Powder • Rodine (liquid extract of red squill) • Antu Technical • Antu 20% Tracking Powder

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"TOX-EOL" for TERMITE CONTROL

Backed by 15 Years Effective Use

FOR WOOD AND SOIL TREATMENT

PRACTICALLY STAINLESS!

NO LASTING ODORS!

Available in a 12½ to 1 Concentrate

Advertising and dealer cooperation furnished contract agents including a 5-year warranty. We only have a few open territories but yours might be open. Write today for details.

CRE-O-TOX CHEMICAL COMPANY

Pioneers in the use of chlorinated phenols for termite control.

Broad St. at Union R. R. — Box 5218 — Memphis (12) Tennessee

ner meeting to which the ladies were invited.

Jack Benmosche of Pest Control Equipment Co., New York city, was welcomed into membership of the association at this meeting. Others interested in joining this association are urged to contact A. E. Ritt, chairman of the membership committee, 1437 W. Wyoming Ave., Philadelphia 40.

It was announced that $257.20 was added to the Vogel Memorial Fund this year for the furtherance of pest control research at the Pennsylvania State College.

"Beanstalk" Explained

Out in Oakland, California, they may have an explanation for the phenomenon of the skyrocketing beanstalk in the Jack and the Beanstalk story of old.

Hollyhocks, snapdragons and shrubs in a half-dozen private gardens around the Oak Knoll Naval Hospital were growing so fast you could almost see it. Trouble was, the new growth was assuming fantastic shapes, with curled and twisted stems. The taller plants, tiring after their unusual vigor, began to lie down.

Someone noted that one of the affected gardens had recently been sprayed, but the pest apparently hadn't been controlled. Eventually came the explanation. Someone had dumped a can of weed killer into the pest spray and the sprayers had drench the gardens with that hormone stuff that makes weeds of the broad-leaved variety grow themselves to death. "Sabotage" cried the spray company. Luckily damage was not extensive. Smaller plants have been replaced, while trees and shrubs are getting back to normal after a bit a pruning.

Ind. PCA Picks Partlow

(from page 42)

State Parks. Present at the May meeting were:

Harry Bauman, A. D. Bosley, Wm. Brehm, E. A. Burdu, Professors J. J. Davis, H. O. Deay, John Osmun, and B. E. Montgomery, Kenneth H. Draper, C. J. Gaetz, Walter S. Gibson, George Gilmore, Mr. and Mrs. George Hunter, Elmer Kuntz, Charles Partlow, Harlan Shuyler, George Spellios, Lee Truman, C. L. Underwood, Gene Wilkof, Robert O. Williams, D. Wilson and Clayton Wright.

2, 4, 5-T For Brush Control

A new product in chemical weed and brush control is 2,4,5-T, reports the California Spray-Chemical Corporation. This new weed killer is the "isopropyl ester of 2,4,5-T trichlorophenoxyacetic acid." It is a close cousin of the well known 2,4-D and also kills by hormone action, the company claims.

2,4,5-T givts control of blackberries, poison oak, willows and hard-to-kill brush plants such as sagebrush and mesquite where they are a problem in pastures, range land, farm-yards, along fence rows, ditch banks and rights-of-way.

The corporation announces it has perfected a commercial weed killer, Estercide-T 245, which is now available. It mixes readily with water or oils and can be used in combinations with 2,4-D where desirable for extended coverage and utility.

Stops the Music

Francis J. LuBien, former employee of PCO Harold C. Kaufman, Chicago, left the pest control business in 1941 to return to his old job of cabinet-maker. Today he is $30,000 richer because he read a daily radio column in the Chicago *Sun-Times* that revealed the title to the mystery tune on Sunday's "Stop the Music" show. Called on the phone by the program's' quizmaster, LuBien came up with the correct answer: "Are You a Buffalo?" LuBien, who is the father of seven, earns $50 a week on his regular job.

1080 Origin

1080, the toxic rodenticide manufactured by Monsanto Chemical Co., was discovered by South African tribesman, who extracted it in crude form from a plant called ratsbane and used it to poison their enemies' water supplies as well as to fight rats. The toxicity of 1080 was put to more practical use at the beginning of the war by three Polish scientists, who smuggled reports of their research to England through the underground.

PESTALES

Wrong One

This story is told about Charlie Chaplin's battle with a fly that kept buzzing around him during a picture conference. After slapping at it several times, Charlie became exasperated and called for a swatter.

As the discussion continued, he sat with the swatter poised and aimed a menacing eye on the elusive fly. Three times he swung at it; three times he missed. At last the fly settled on a table directly in front of him, and Charlie tensed for the kill. Slowly, cautiously, he raised the swatter. But just as he was ready to deliver the death blow, he deliberately lowered his weapon and allowed the fly to escape.

"For heaven's sake" someone blurted out. "Why didn't you swat it?"

Charlie shrugged — "It wasn't the same fly."

Nice

If more than one mouse is mice, and more than louse is lice, then you must agree, quite obviously, that more than one spouse is spice.

Needs Bear Trap

Recently two radio patrolmen in Oklahoma City turned on the siren and moved to the rescue. Arriving at the scene, an Oklahoma City housewife told them:

"I'm scared to death. There's a ferocious long-tailed creature in my kitchen tearing everything apart."

The officers reported to headquarters:

"We found a tiny mouse with his tail caught in a mousetrap running around the kitchen floor."

No doubt the lady's saviours used the proper methods to dispose of the beast — probably the nearest broom.

He Wanted to Annoy His Pests

From jolly old London comes a a report about one Angus Harper, 26, who got nine months in jail when he pleaded guilty to lacing the family butter with a preparation for killing garden pests. Said he wanted to annoy his in-laws!

TERRATOX
1 to 4 formulations assure uniform solutions

The effectiveness of any formula for destroying termites largely depends on the *uniformity* of the solution. Due to a special scientific formula, the toxics in TERRATOX remain in suspension, assuring equal effectiveness *from every application.*

Pentachlorophenol has proved by factual tests to be the most potent chemical for termite control. All TERRATOX solutions contain a minimum of 5% Monsanto Pentachlorophenol.

- Available NOW in freight saving concentrate form.
- Write TODAY for complete details to help you promote profitable customer pleasing jobs.

WOOD TREATING Chemicals Co.
5137 Southwest Ave.
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Kennadrills
Drill Masonry *Fast!*
Save Money

"98 holes in cement, 3½ inches deep. 2 hours, 5 minutes."

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"7½ hours of drilling time saved in one day."

Pest control operators get speeds and savings with the Kennadrill because it drills up to 5 times as fast as conventional bits and it stays sharp up to 100 times longer. The Kennametal edge of Kennadrills has diamond-like hardness and it resists wear, shock, and abrasion. Turbine action ejects the cuttings and keeps the bit from binding or stalling. Bit sizes are ¼" to 1½" and TILE, BRICK, CEMENT, STONE, WALL BOARD, PLASTER, etc., can be drilled with light hand held rotary drills.

Write for bulletin PCK now.

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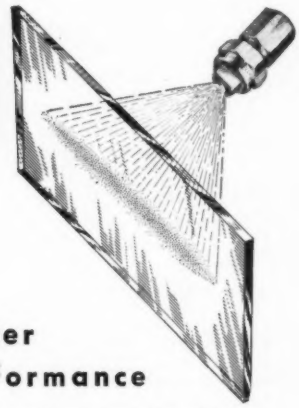
TeeJet
SPRAY NOZZLES



better performance

For the residual spraying of insecticides, you will find TEEJET spray nozzles give the uniform distribution and proper atomization necessary for an effective spraying job. TEEJET spray nozzles are precision built with a wide range of interchangeable orifice tip sizes. Write for complete information.

SPRAYING SYSTEMS CO.
Engineers and Manufacturers
3221 RANDOLPH STREET • BELLWOOD, ILLINOIS (Suburb of Chicago)

CLASSIFIED ADVERTISEMENTS

When answering ads where box number only is given, please address as follows: Box number, c/o Pests and Their Control, 1900 Euclid Building, Cleveland 15, Ohio.

Rates: "Position Wanted" 5c per word, minimum, $1.00. All other classifications, 10c per word, minimum $2.00. All classified ads must be received by Publisher at least two weeks preceding publication date and be accompanied by cash or money order covering full payment.

FOR SALE

Established pest control business in Texas. For the price I am asking, it will pay for itself in one year. Correspondence confidential. Write:

Box 216 Pests and Their Control

FOR SALE

Pest control service, including equipment and insecticides. Can handle any size job. Finest location in Midwest; city of 40,000. Doing good business and prospects excellent with minimum competition. $5000 will buy. Write for particulars. Hasting Pest Control Service, 1510 Locust St., Ottumwa, Iowa.

FOR SALE

Insecticide Business — outlet nationally through jobbers and stores. Established 1932. Reason for selling; old age. Jones Products, Milwaukee 6, Wisconsin.

IMMEDIATE SHIPMENT

One pound cans war surplus Methyl Bromide, 48 to case. Minimum order 10 cases. Full weight guaranteed. 22c per lb., f.o.b., New York. Berk Co., 305 Broadway, New York 7, New York.

MAILING LIST

2,704 pest control operators, U.S.A. Guaranteed 98% accurate. $10 per thousand. Your envelopes machine addressed, $4 per thousand. Write: Televads, Box 119, Wichita, Kansas.

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Can You Identify Flies?

(from page 18)

usual conditions are encountered. An accurate identification will be returned in a short time. Fly larvae should be submitted in a small vial of rubbing alcohol. Specific identification of larvae is usually impossible, but the genus or general group can be determined if the specimens are in good condition.

Illustrations and a good discussion of the appearance and biology of many of the fly control operators may encounter can be found in U.S.D.A. Miscelleaneous Publication No. 631 entitled, "The Flies that Cause Myiasis in Man." This publication may be consulted in most large libraries, or may be purchased from the Superintendent of documents, U. S. Government Printing Office, Washington 25, D. C.

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1250—50 lb. drums
14c lb.

RED SQUILL
Deth Diet (Penick)
500/600 MG/KG
15—25 lb. cans
$1.00 lb.

PARIS GREEN
(General-Dow)
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17c lb.

SODIUM FLUORIDE
6000—1 lb. bottles
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THALLIUM SULPHATE
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PEST and RODENT CONTROL
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120 Broadway New York 5, N. Y.

Machinery and Spot fumigation

IS SIMPLE AND PROFITABLE with...

Here is a profitable opportunity to extend your service scope! Dowfume EB-15 (containing 15% by volume of ethylene dibromide) is an improved machinery and spot fumigant for use as a supplementary pest control measure. Adaptable for use in flour mills or bakeries, it offers an efficient means of eliminating insects in their breeding places, such as in dead stock and in machinery capable of retaining fumigant vapors for reasonable lengths of time. When properly applied, it leaves no objectionable residues in food products and equipment.

Application equipment for Dowfume EB-15 consists simply of a number of 32-oz. prescription bottles and a few wire baskets of the type used for carrying milk bottles. The operator pours the fumigant into the various units as recommended in the dosage and exposure chart which is yours on request.

Get the facts! Write our Fumigant Division for complete information.

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

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Dowfume EB-15

DOW

CHEMICALS INDISPENSABLE
TO INDUSTRY AND AGRICULTURE

TAKE NO CHANCES

Chlordane will settle out if packed in ordinary metal containers!

COOK'S CHLORDANE Is Packed Only In Glass Jugs or Aluminum-Lined Drums!

COOK'S 20% REFINED CHLORDANE CONCENTRATE

This is 20% by weight. To be diluted 9:1 with deodorized petroleum solvent.

4 / 1 gal. glass jugs to case	**$3.25 per gal.**
30-gal. aluminum-lined drums	**$2.75 per gal.**

COOK'S CHLORDANE EMULSION CONCENTRATE

To mix with water. For industrial and vegetation use. Kills roaches, waterbugs, grasshoppers, mites, chiggers, red bugs and certain other insects. CONTAINS 4 LBS. CHLORDANE PER GALLON.

4 / 1 gal. glass jugs to case	**$7.25 per gal.**
30-gal aluminum-lined drums	**$7.00 per gal.**

NOTE: Case lot shipments only . . . Freight paid on all sales of 100 lbs. or over.

Cook Chemical Company

935 NORTH WABASH AVENUE KANSAS CITY 1, MISSOURI

MAKERS OF FAMOUS COOK-KILL BUG KILLER

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